COFFEE AND CONSERVATION: THE ECOLOGY AND MARKETING OF BIRD FRIENDLY COFFEE

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ABSTRACT

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Coffee is one of most valuable traded commodities in the world and a major source of foreign exchange earnings in many developed countries. Over the past 30 years, shade-grown coffee cultivation has become widely recognized as an important reservoir for biodiversity. Land use changes and rapid population growth are causing a global extinction crisis. Due to loss of habitat, one in eight bird species worldwide faces the threat of extinction, with the vast majority of threatened species inhabiting tropical forests. New consumption patterns have emerged with the growing importance of organic, Fair Trade, and shade-grown coffee. Shaded coffee plantations, specifically Bird Friendly certified ones, provide a refuge for biodiversity, particularly for migratory birds. They also offer numerous ecological and economic benefits. With an increasing awareness of the gravity of environmental and social problems, consumers are demanding more transparency and eco-friendly products, such as certified coffee. However, in a highly competitive coffee market where specialty coffee consists of only 8% of the total global coffee market, Bird Friendly coffee struggles to gain a substantial foothold in the coffee market. This paper seeks to answer the questions: What are the ecological and socioeconomic benefits to cultivating Bird Friendly coffee? Do Bird Friendly coffee farms actually help migratory birds and farmers? How is Bird Friendly coffee marketed? How should Bird Friendly coffee be marketed in order to increase awareness and demand?

First, I will examine and assess the ecological benefits and challenges of shade-grown coffee, with a focus on Bird Friendly coffee. Second, I will analyze whether Bird Friendly farms hurt or help farmers and recommend solutions for sustainable livelihoods. Lastly, I will provide suggestions on how to effectively market Bird Friendly coffee.

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BF	Bird Friendly
BFC	Bird Friendly Coffee
CBB	Coffee Berry Borer
IFOAM	The International Federation of Organic Agriculture Movements
FAO	Food and Agriculture Organization
FLO	Fairtrade Labeling Organizations International
NGO	Non-Governmental Organization
NOP	National Organic Program
NRCS	Natural Resources Conservation Service
OCIA	Organic Crop Improvement Association
OTA	Organic Trade Association
RA	Rainforest Alliance
SAN	Sustainable Agriculture Network
SMBC	Smithsonian Migratory Bird Center
SCAA	Specialty Coffee Association of America
USDA	United States Department of Agriculture

Chapter 1

Introduction

"When one tugs at a single thing in nature,
he finds it attached to the rest of the world."
– John Muir

The sound of birds chirping amongst a bright sunrise while drinking a morning cup of joe provides more context than one might believe, as the coffee one consumes can indirectly provide a bird-friendly habitat. Like much of the coffee consumed in the United States, which is grown in Central and South America, the birds enjoying the morning sunrise are also familiar with the region given their migration patterns. Although the sunlight signals the beginning of a fresh day with new opportunities, the same cannot be said for birds being forced out of their natural habitats in favor of coffee production that occurs in the full sun. Despite appearing harmless to the environment, coffee beans produced in the full sun decimate ecological systems and weaken canopy density in ways that threaten a plethora of aviary species. Therefore, the morning pick-me-up from your local coffee shop that stimulates your senses and awakens your mind comes at a cost far greater than the $3 charge; it requires environmental degradation and reduces sustainability in some of the most forest-rich regions of the world.

Although coffee production long occurred under the shade of large trees within tropical rainforests, a transition occurred over the last three decades that saw most coffee production turn to full sun operations. The wildlife that once thrived in the shade canopies of shade production was displaced in the process, as producers attempted to meet the growing demand of coffee from American consumers. To fulfill full sun production requirements, significant areas of dense forest were cleared and birds and other species immediately lost their homes. The reduction of

tropical forests throughout Central and South America has significantly diminished the populations of songbirds and other migratory birds. But it is not just birds getting the short end of the branch, as other wildlife face the consequences of extensive forest clearing efforts. To address the reduction in viable forest habitats, a return to shade coffee production is required. Therefore, certified farms that promote and utilize shade production techniques are crucial to reversing the effects of full sun production. Bird Friendly certified coffee farms, which operate under strict organic and shade growth requirements, provide biodiversity and are "dripping" with birds and other wildlife.

Coffee, the beverage selection of billions of people, provides more than a quick beverage on-the-go; it is a cultural, economic, and biodiversity powerhouse. Coffee is the second most valuable international commodity after oil, and every day, about 2.25 billion cups of coffee are consumed in the world.[1] Yet, despite its ubiquity, we rarely consider how our morning cup of coffee was grown.

As consumers, we can participate by making choices with our coffee. If we continue to buy cheap, corporate coffee, then we are contributing to the destruction of bird habitats and to the decline of migratory songbirds. Drinking Bird Friendly coffee is one of the best ways you can do your part to preserve the habitats of our migratory songbirds and other species.

In this paper, I will first present a short historical overview of coffee growing and technificaiton in Latin America. Next, I examine the ecological benefits of shade-grown coffee. Within this section, there will be a discussion of coffee agroecosystems, the direct and indirect benefits of shade practices and ecosystem services.

[1] "What Are We Drinking? Understanding Coffee Consumption Trends," The First Pull: National Coffee Association USA, last modified March 19, 2016, https://nationalcoffeeblog.org/2016/03/19/coffee-drinking-trends-2016/.

This thesis will then address the rise of sustainable coffee certifications such as organic, Fair Trade, and shade-grown. Following this discussion, I will present Bird Friendly coffee in detail and describe its positive ecological impacts.

Next, I will analyze the costs involved in obtaining and retaining organic and shade-grown certifications. I will answer the question, Are Bird Friendly coffee farms profitable for farmers? I will proceed by providing recommendations to improve the financial viability of Bird Friendly coffee.

Lastly, this thesis will examine the current American market for sustainable coffee. I will analyze the strengths, weaknesses, threats and opportunities of Bird Friendly coffee within the marketplace and provide recommendations to help Bird Friendly coffee flourish in emerging coffee markets.

Chapter 2

The History of Coffee Growing and Technification in Latin America

2.1 The History of Coffee Growing

The primary two coffee species grown for export, *Coffee arabica* and *Coffee canephora* (robusta), both originate from Africa. Arabica is higher quality, while Robusta exhibits pest resistance, higher yield and higher caffeine content. *Coffee arabica* dwarfs other coffee varieties, as the species represents 70% of global production.[2] For the purposes of this paper, I focus on *Coffee arabica.*

Coffee production's origination in Ethiopia facilitated massive dispersion efforts thanks to extensive trade routes throughout Arab countries that created pipelines to Europe by the 1500s. The growth of coffee production continued in the next few centuries, with Central and South America housing significant coffee production by the mid-1800s. The growth in the American tropics occurred swiftly, as coffee production represented more than 8.8 million hectares by the 1970s.[3]

Over the course of the two decades spanning from 1970 to 1990, land dedicated to coffee production grew by 25% and production realized a 58% increase.[4] From 1990 to 2010, the areas dedicated to coffee production shrank, but production's growth continued, which reveals better land utilization and improved efficiency. The shrinkage of areas devoted to coffee production also reveals the closure of coffee plantations in some regions and the enhancement of production techniques in others. The alteration to agricultural landscapes extends beyond coffee production, as crop management has seen substantial changes over the same period.

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[2] Ibid.
[3] Shalene Jha et al., "Shade Coffee: Update on a Disappearing Refuge for Biodiversity," in *BioScience* (n.p.: Oxford University Press, n.d.), 416, 5th ser., 64 (May 2014): 416-28.
[4] Ibid.

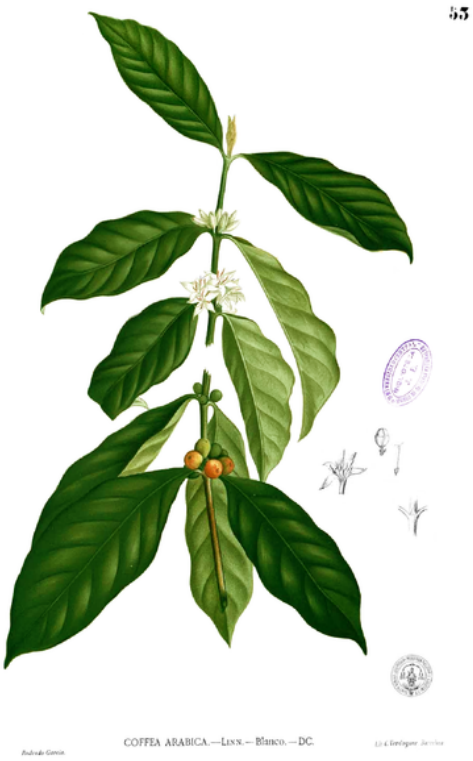

Figure 1: Botanical drawing of *Coffee arabica,* around 1880[5]

2.2 Technification of Coffee Farms in Latin America

Coffee cultivation techniques range from traditional coffee growing practices to the modern coffee system. Traditional methods for growing coffee involve planting shrubs under a diverse canopy of shade trees in high to moderate shade. The early production of coffee required clearing out the forest understory, but not the forest canopy. Through this method, traditional coffee growing becomes an integral part of a diverse agroforestry system, in which tree species are cultivated together with coffee and other useful agricultural commodities. As coffee became

[5] "A Botanist's Guide to Specialty Coffee," Specialty Coffee Association of America, http://scaa.org/index.php?goto=&page=resources&d=a-botanists-guide-to-specialty-coffee.

a true global commodity, coffee plantations spread throughout the tropics. For the past 200 years, nearly all coffee produced in the tropics has been grown under shaded conditions.[6]

Beginning in the 1970s, an increase in global demand for coffee and the invasion of coffee leaf rust (*Hemileia vastatri)*, a fungal disease that hampers coffee production, drove the intensification of coffee cultivation in Latin America.[7] To increase yields and to control coffee leaf rust, scientists pushed coffee growers to intensify their farms by switching from traditional Arabica bean trees grown under shade to trees of "modern," hybrid Arabica beans, which can tolerate full sun, in concert with the necessary addition of agrochemicals.[8] This "intensification" or "technification" of traditional coffee systems into sun-grown coffee farms decreases the tree species' diversity and severely reduces or eliminates the shade canopy. By eliminating shade trees, intensified coffee plantations can produce more beans, but must also increase the use of agrochemicals, such as synthetic fertilizers, pesticides, herbicides, and fungicides.[9]

Sun-grown Arabica coffee varieties emerged after researchers developed a smaller hybrid that could tolerate direct sunlight. A modern monoculture (sun-grown coffee), where coffee grows without any type of shade, is the most intensified type of vegetation management. Given the economic opportunities coffee provided, several governments in Central and South American countries subsidized the intensification and transition to sun-grown coffee to produce coffee faster, prevent the spread of coffee leaf rust, and encourage overall economic growth.[10] Additionally, in Central America, the U.S. Agency for International Development provided more

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[6] Jha et al., "Shade Coffee," in *BioScience*, 417.
[7] Mark Pendergrast, *Uncommon Grounds*, rev ed. (Philadelphia, PA: Basic Books, 2010), 369.
[8] Catherine M. Tucker, *Coffee Culture: Local Experiences, Global Connections*(New York, NY: Routledge, 2011), 101.
[9] Gerd Fleischer, "Toward More Sustainable Coffee: Consumers Fuel Demand For More Sustainable Agriculture," Rural Development Department: The World Bank, last modified June 2002, http://documents.worldbank.org/curated/en/430971468739806516/pdf/multi0page.pdf.
[10] Kent D. Messer, Matthew J. Kotchen, and Michael R. Moore, "Can Shade-Grown Coffee Help Conserve Tropical Biodiversity? A Market Perspective," *Endangered Species* 17, no. 6 (2000): 126, Cornell University.

than $80 million for the switch to sun-grown coffee.[11] Once farmers found that growing these new varieties of coffee in full sun created the highest yields, many farmers, especially large-scale producers, rapidly adopted sun-grown coffee. Between 1970 and 1990, about 50% of shade coffee farms had been converted to low-shade systems.[12] During this time, intensification varied from country to country, ranging from 69% of farms in Colombia, to 40% of farms in Costa Rica, and 15% of farms in Mexico. Since 1972, of the 6.9 million acres of coffee lands, 60% have been completely stripped of shade trees.[13] Although sun-grown coffee improves yields and increases income, technification has had significant environmental impacts, such as increased soil erosion, pests and diseases, chemical run-off, and forest reduction. However, the most critical impact is the severe loss of habitat and refuge for biodiversity.

Sun-Grown Coffee **Shade-Grown Coffee**

Figure 2: Comparing coffee growing practices: sun-grown (left) vs. shade-grown (right)[14]

[11] Ibid.
[12] Jha et al., "Shade Coffee," in *BioScience*, 417.
[13] Ibid.
[14] Gustave Axelson, "In Colombia, Shade-Grown Coffee Sustains Songbirds and People Alike," Cornell Lab of Ornithology, last modified October 11, 2016, https://www.allaboutbirds.org/in-colombia-shade-grown-coffee-sustains-songbirds-and-people-alike/.

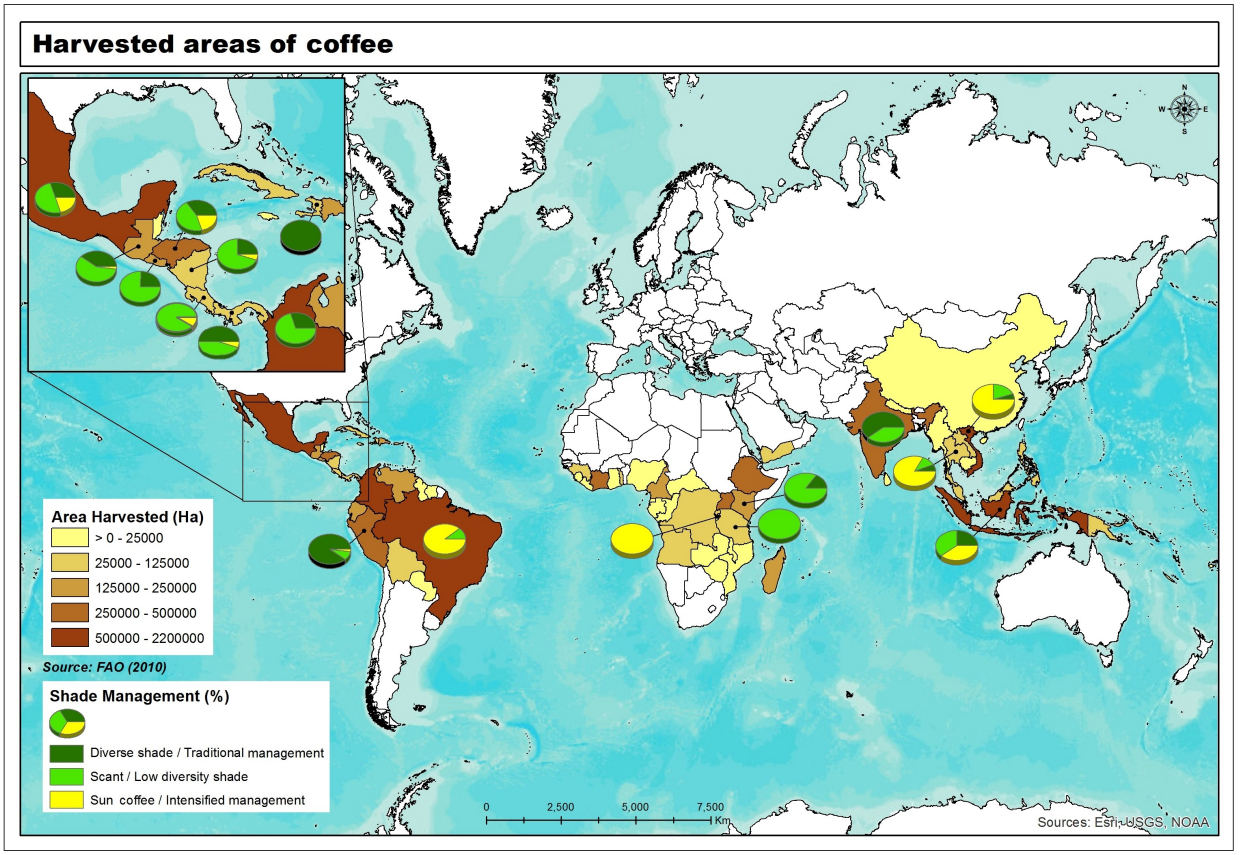

Figure 3: Percentage of cultivated coffee area managed under different management practices[15]

Shade-grown coffee is a small understory shrub planted under an arboreal canopy, the foliage above the coffee bushes. The different layers of vegetation provide shelter and food for animals, help with microclimate stabilization, protect from soil erosion and water run-off, and replenish the soil through leaf litter. Coffee naturally grows in biodiversity rich tropical rainforests and Arabica shrubs prefer these shaded environments. While the lands used to cultivate coffee crops are fractionally minimal compared to all the Earth's land, these biodiversity hotspots have an enormous impact in securing our global biodiversity.

Furthermore, the management styles for growing coffee differ from region to region, with intensification of production being adopted or promoted to varying degrees.[16] For instance, a coffee monoculture consists of a single shade species dominating a farm, while a polyculture

[15] Jha et al., "Shade Coffee," in *BioScience*, 419.
[16] Thurston, Morris, and Steiman, *Coffee: A Comprehensive*, 43.

contains a high diversity of shade tree species. Some farms may grow hedgerows upon hedgerows of coffee without any shade, while other farms grow coffee under shade cover that is indiscernible from a natural forest. It is important to understand that not all agroforests are equal; coffee can be grown under a mosaic of shade conditions. Shaded coffee habitats vary in foliage density, structural diversity, and floristic diversity. There are five categories of shade, ranging from the traditional, higher diversity of species method, to the technified, least diverse method.

- **Rustic.** Rarest practice, used by small family farms. Coffee is planted within the existing forest. Little alteration of native vegetation, only the lowest strata is replaced with the coffee crop. Features of this method include, minimal management, least capital-intensive, no use of pesticides or herbicides, and low yield. Many diverse tree species, with around twenty-five various species. Three or more shade strata (layers of vegetation formed by the difference in height of the trees that make up the forest canopy). There is about 70-100% shade cover.

- **Traditional Polyculture.** Coffee grown beneath a mixture of planted tree and plant species and native forest trees. The integration of tree and plant species are beneficial for both the farmer. The introduced plants yield fruits, vegetables, medicinal plants, fuel wood, etc. This crop diversification creates the highest level of "useful diversity" in coffee farming. Frequently found tree species include *Acacia, Grevillea, Gliricidia, Inga, Erythrina*. There is about 60-90% shade cover.

- **Commercial Polyculture.** More foliage removed to make room for more coffee plants or other beneficial plants. Canopy trees are occasionally pruned, and epiphytes are usually removed. Fertilizers and pesticides become necessary as a result of less foliage. This coffee growing system features higher yields and market-driven production. Only two shade strata, the coffee and the canopy. There is about 30-60% shade cover.

- **Shaded Monoculture.** Dense amounts of coffee plants are grown under one or two heavily pruned canopy species (typically *Inga*). Epiphytes are removed. This coffee growing system features an organized farm, with the only intention of producing crops that are solely market-based. There is about 10-30% shade cover.

- **Full Sun or Unshaded Monoculture.** The modern, technified system with no tree canopy. This coffee growing system features the highest usage of pesticides and chemical fertilizers, intensive labor, and the highest yield in coffee production. No shade cover.[17]

[17] Julie Craves, "What Is Shade-Grown Coffee?," Coffee & Conservation, last modified February 6, 2006, http://www.coffeehabitat.com/2006/02/what_is_shade_g/.

Here is a diagram depicting the categories:

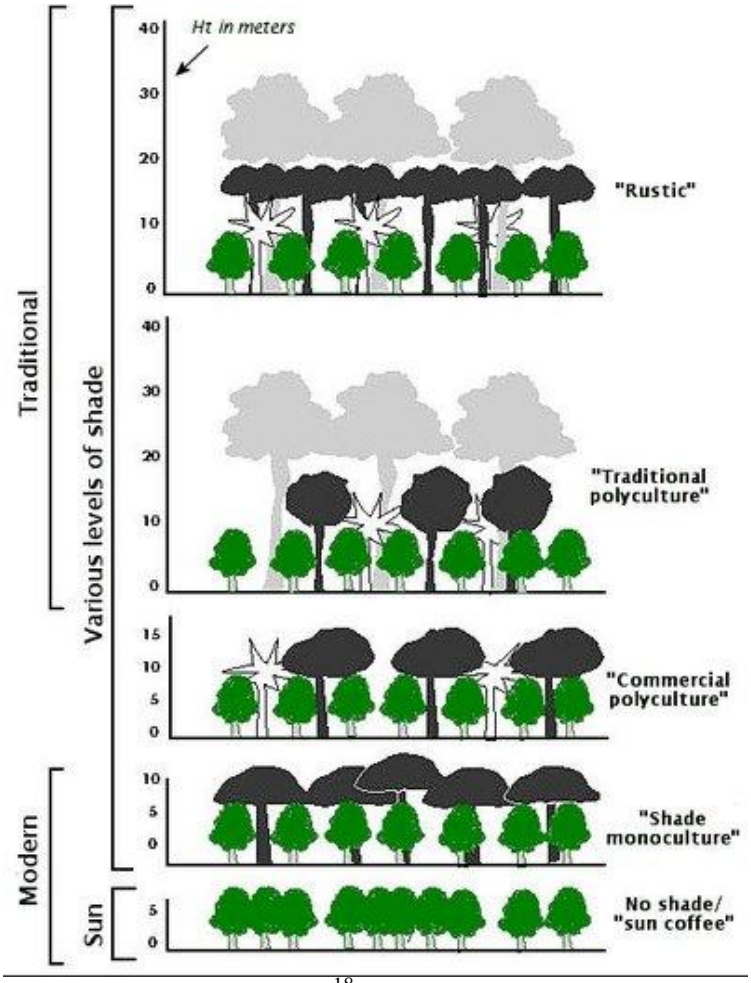

Figure 4: Levels of shade[18]

While *Coffee arabica* naturally grows in the shade, it also grows in cloud forests. Cloud forests are a type of rainforest which occur at middle and high altitude mountains in the tropics. They are characterized by low-level cloud cover, usually at the canopy level. Because of the high elevation–between 2,000 and 3,500 meters–and the high moisture levels, cloud forest coffee farms are surrounded with misty clouds. Humidity and low light levels do not allow the coffee to be grown under multiple layers of shade. Despite the fact that coffee in cloud forests does not grow under a shade canopy, cloud forests support and provide important habitats for endemic

[18] Biodiversity Conservation in Traditional Coffee Systems of Mexico. 1999. *Conservation Biology* 13:11-21.

fauna. [19] Moreover, coffee can be grown under a variety of shade conditions; however, the amount of shade needed varies with local climatic conditions. Generally, the more shaded a coffee farm, the greater the habitat and flora and fauna diversity.

[19] Plant Collections Department of the San Francisco Botanical Garden Society, "What Are Cloud Forests?," Cloud Forests: Conserving Our Botanical Treasures, http://www.sfbotanicalgarden.org/cf/cf/.

Chapter 3

The Ecological Benefits of Shade-Grown Coffee

3.1 Coffee Agroforests

Earth is experiencing a global extinction crisis due to land use shifts and rapid population growth. Tropical forests support the greatest biodiversity in the world; they are the central nervous system of the planet.[20] Rainforests are home to more than 70% of animal and plant species, making them the most biologically rich ecosystems. However, the biodiversity in many tropical forests is rapidly declining. Over the past decade, eighteen million hectares of forest have been destroyed each year, with most deforestation targeting the tropics.[21] The rapid disruption of tropical forests constitutes the greatest danger to global biodiversity. Deforestation brings about changes in animal and plant communities at an alarming rate, which rapidly transforms ecosystems and subsequently affects human society at large.

Maintaining the integrity of biodiversity remains a global priority since the human activity influences the area substantially. Agriculture represents 38% of the globe's land surface and the primary cause of deforestation.[22] Thus, farms can serve as crucial areas for wildlife. Over the past twenty years, the environmental and conservation value of coffee agroecosystems as species safe havens has become a major focus. The transition towards environmentally conscious production includes agroforestry, a land use management system that deliberately incorporates a mixture of trees and shrubs into farms. Agroforestry systems are "considered a promising alternative to conventional agriculture that can both conserve biodiversity and support local

[20] Rainforest Alliance, "What Is A Tropical Forest?," Rainforest Alliance, last modified August 30, 2012, http://www.rainforest-alliance.org/faqs/what-is-a-tropical-forest.
[21] Evan R. Buechley et al., "Importance of Ethiopian Shade Coffee Farms for Forest Bird Conservation," *Biological Conservation* 188 (August 2015): 55, ScienceDirect.
[22] Evan Buechley, "Why Shade-Grown Coffee is Good for Birds and Farmers," The Conversation, last modified February 26, 2015, https://theconversation.com/why-shade-grown-coffee-is-good-for-birds-and-farmers-37567.

livelihoods."[23] Coffee produced on agroforestry farms is known as "shade-grown coffee."

In terms of conservation, an ideal forest functions in its natural form; however, coffee agroforestry systems mimic forest-like conditions, which "allow for a wealth of ecological dynamics to occur."[24] They play an integral role in supporting many species, permitting the existence and continuation of ecological processes, and assisting in preserving the integrity of environmental landscapes that would undoubtedly lack biodiversity without such assistance.

3.2 Species Diversity in Coffee Agroecosystems

Coffee agroecosystems support significant numbers of species by providing extensive habitats for wildlife. There exists a correlation between the structural complexity of shade and the diversity of species and habitat qualities: managing more trees as shade cover supports a more diverse species community and provides better habitat than managing fewer trees.[25] As land use management practices become more technified, the diversity of trees, birds, and other species decline. For the past twenty years, researchers have noted that shade coffee provides viable habitats for birds, non-volant mammals, bats, arthropods, and amphibians.

3.2.1 Birds and Mammals

Coffee agroforestry systems harbor high species richness for most taxa examined. The structural and floristic diversity of the forest canopy provides important habitat for diverse avian communities. The impact of coffee systems on birds will be discussed in vast detail later in this paper.

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[23] Vivian Valencia et al., "The Role of Coffee Agroforestry in the Conservation of Tree Diversity and Community Composition of Native Forests in a Biosphere Reserve," *Agriculture, Ecosystems & Environment* 189, no. 1 (March 24, 2014): 154, ScienceDirect.
[24] Robert Rice, "The Ecological Benefits of Shade-Grown Coffee," Smithsonian's National Zoo & Conservation Biology Institute, last modified September 2010, https://nationalzoo.si.edu/scbi/migratorybirds/coffee/bird_friendly/ecological-benefits-of-shade-grown-coffee.cfm.
[25] Ibid.

Like birds, mammals benefit from the refuge provided by shade-grown coffee farms. For instance, a study on three coffee-forest landscapes located in Turrialba, Costa Rica found a rich community of non-volant mammals (those incapable of flight).[26] The species richness and abundance almost mirrored that of natural forest habitats. The increased amounts of lower strata vegetation and canopy cover resulted in higher levels of small mammal species and abundance. Additionally, bats are excellent indicators of the health of the environment. A study on bats in the Western Ghats of India showed no significant difference in the richness of bat communities within shade coffee habitat versus that of natural forest patches. Thus, if bats are living in coffee plantations, then the habitat is likely to be a healthy environment.[27]

Furthermore, a study in Chiapas, Mexico, found that bat diversity differed in various types of shade-grown coffee farms. Polyshade and monoshade farms with high, low, or no chemical inputs harbored 23-27 species, while unaltered montane rainforests had the highest number of species (37 species). Therefore, this study shows that bat species richness is significantly related to the number of vegetation strata, height, and cover of trees. Moreover, mammals benefit from and depend on shade-grown coffee farms for survival.[28]

3.2.2 Arthropods and Amphibians

Coffee agroecosystems serve as a refuge for beneficial arthropods (native and introduced insects, spiders, mites, etc.) and amphibians, leading to higher levels of biological control. For example, in Costa Rica, the diversity of insects in coffee agroecosystems comes close to numbers

[26] S. Amanda Caudill, Fabrice DeClerck, and Thomas P. Husband, "Connecting Sustainable Agriculture and Wildlife Conservation: Does Shade Coffee Provide Habitat for Mammals?," *Agriculture, Ecosystems & Environment* 199 (January 1, 2015): 85, ScienceDirect.
[27] Archana Bali, Ajith Kumar, and Jagdish Krishnaswamyb, "The Mammalian Communities in Coffee Plantations around a Protected Area in the Western Ghats, India," *Biological Conservation* 139, nos. 1-2 (June 17, 2007): 93, ScienceDirect.
[28] Carlos G. Estrada et al., "Bat Diversity in Montane Rainforest and Shaded Coffee Under Different Management Practices in Southeastern Chiapas, Mexico," *Biological Conservation* 132 (June 2006): 351, ScienceDirect.

commonly discovered in areas of lowland rainforest.[29] Shade coffee also conserves ant, bee, beetle, spider, and butterfly diversity, many of which play a vital role in ecosystems.

Likewise, shade coffee benefits amphibians. A study conducted near the community of El Molote in southern Mexico, considered the abundance and diversity of salamanders and frogs in various habitats. Researchers determined that the type and number of amphibians were contingent on the type of land meeting the forest. When shaded coffee plantations met forest, the coffee crops enhanced the properties of the forest. Since amphibians desire higher levels of leaf litter and humidity, the shaded coffee crops conserve the desired environment.[30]

3.3 Indirect Benefits of Shade Coffee as a Habitat: Connectivity

Shade-grown coffee farms serve as important biological corridors that increase connectivity between fragmented forest landscapes. The existence of birds amongst other organisms in the shaded coffee landscapes "establishes linkages and services not normally associated or recognized with agricultural lands."[31] Shade coffee systems help link forests fragments within geographic regions. Birds and other pollinators utilize shade coffee systems as stopping points between locations along their migratory paths. The importance of "connectivity between coffee and native forests is tremendous, given the overlap and proximity of biodiversity hotspots and coffee-growing regions."[32] Thus, shade-grown coffee farms represent important biological corridors for birds, bats and bees.

[29] Rice, "The Ecological," Smithsonian's National Zoo & Conservation Biology Institute.
[30] Georgina Santos-Barrera and Nicolas Urbina-Cardona, "The Role of the Matrix-Edge Dynamics of Amphibian Conservation in Tropical Montane Fragmented Landscapes," *Revista Mexicana de Biodiversidad* 82, no. 2 (June 1, 2011).
[31] Jha et al., "Shade Coffee," in *BioScience*, 423.
[32] Ibid.

3.4 Habitat: Flora Diversity and Shade Impacts

Coffee agroforestry systems in Africa, Latin America, and Asia often harbor high levels of tree species richness and their structural diversity resembles surrounding native forests. The environmental value of shade farms must be noted, not just because they serve as safe havens for native plants, but also because they increase flora diversity, maintain the integrities of habitats and where they meet, and provide sources for forest regeneration. In several countries, coffee agroforests have been found to maintain a larger array of tree species than local forest remnants (groves of native trees standing in developed areas). For instance, a study conducted in Chaipas, Mexico found that two types of coffee farms (rustic and planted.) bore greater resemblance to primary forest habitats than secondary ones (forests that have been regrown after a timber harvest).

Furthermore, a rustic coffee farm can host extremely high biological diversity, for example, around 90 to 120 species of plants in a single area. While in a traditional or commercial polyculture coffee farm, there can be around 13 to 58 different plant species per area.

Epiphytes–plants living on other plants–such as bromeliads, orchids, and mosses also vary significantly in traditional polycultures. Unlike parasites, epiphytes grow harmlessly on other plants for physical support and do not derive their nutrients at the hosts' expense. Shaded trees, such as *Inga* spp., harbor epiphytes.[33,34] They "increase the structural complexity of forests by creating a variety of supplementary microhabitats and by adding considerable biomass and surface area to the tree crowns."[35] Epiphytes provide a rich and diverse habitat for birds, small vertebrates, and insects. This paper will discuss the importance of epiphyte flora for bird communities in detail later in the text.

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[33] Andrea Cruz-Angon and Russell Greenburg, "Are Epiphytes Important for Birds in Coffee Plantations? An Experimental Assessment," *Journal of Applied Ecology* 42, no. 1 (February 2005): 151, JSTOR.
[34] Thurston, Morris, and Steiman, *Coffee: A Comprehensive*, 46.
[35] Cruz-Angon and Greenburg, "Are Epiphytes," 151.

3.5 Ecosystem Services

Shaded coffee farms supply a variety of ecological services. Ecosystem services are natural environmental functions that provide positive benefits to people. These include soil protection and erosion control, water conservation, carbon sequestration, climate regulation, pest control, and pollination.

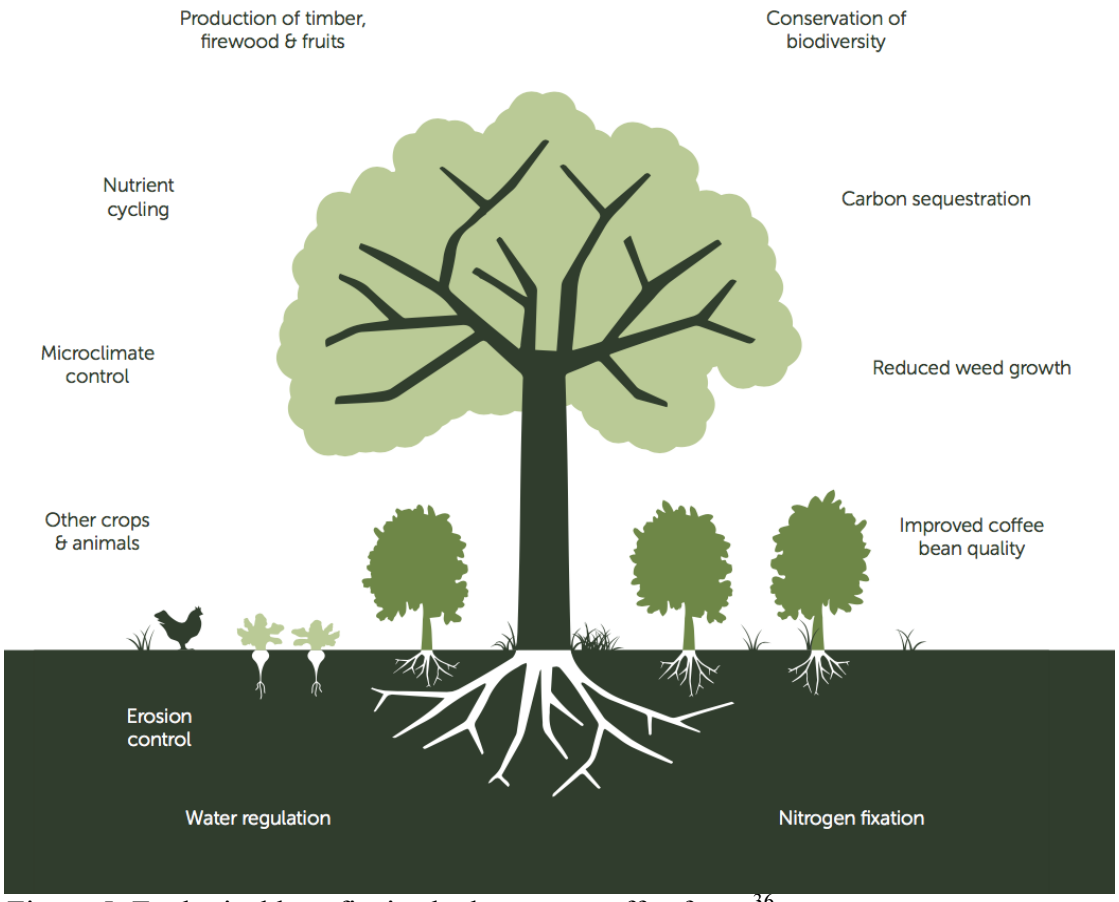

Figure 5: Ecological benefits in shade-grown coffee farms[36]

[36] Rosalien Jezeer and Pita Verweij, "Shade-Grown Coffee: Double Dividend for Biodiversity and Small-Scale Farmers in Peru," *Hivos, The Hague, the Netherlands*, 2015, 6, https://hivos.org/sites/default/files/shade_grown_coffee_report-biodiversity_business_subpage.pdf.

3.5.1 Soil Conservation and Management

Shade-grown coffee farms conserve soil fertility and reduce soil erosion. Coffee often grows on very steep, mountainous landscapes subject to intense rainfall. The presence of canopy and mid-story vegetation in these areas help reduce soil erosion and stabilize slopes. The tree roots, leaf litter on the ground, and leafy canopy aid soil conservation.

Structurally, trees provide extensive root systems that prevent the erosion of fragile mountain soils by helping keep soil clumped together. Numerous, large trees on shade-grown coffee farms help prevent landslides. Many years of research in Colombia found that shade-grown coffee's metric ton loss of soil per hectare per year compared to that of natural forest erosion rates. Similarly, a comparison study in Venezuela revealed that sun coffee farms lost more than two times the soil than that of shade farms due to erosion.[37]

In sun coffee plantations, the lack of canopy complexity exposes soil to extreme tropical rains, leading topsoil erosion. However, in shade-grown coffee farms, the canopy created by shade protects the soil from pounding rains. The complex vegetation in shaded coffee farms creates "more porous soils by both protecting the soil from raindrop impact and loosening soil through root action."[38]

Furthermore, trees provide additional nutrients to the soil through leaf litter. Leaf litter is dead plant material, such as needles, bark, leaves, and twigs that have fallen on the ground. This detritus–dead organic material–and the nutrients of its components blend in with the soil's top layer. The decomposing leaves replenish the soil and recycle nutrients by releasing carbon, phosphorous, nitrogen, and other organic compounds. Yet, these critical nutrients are not available in sun plantations, so fertilizers must be used, especially nitrogen-based ones. However, the existence of agroforestry buffers–strips of different tree species– "within

[37] Rice, "The Ecological," Smithsonian's National Zoo & Conservation Biology Institute.
[38] Elizabeth Teague, "Shade-Grown Coffee: Whats the Big Deal?," Root Capital, last modified March 25, 2015, https://blog.rootcapital.org/back-roads-to-boardrooms/shade-grown-coffee-whats-the-big-deal.

agricultural fields has been associated with increases in soil carbon, soil nitrogen, and soil enzymes, as well as an increase in the presence of water stable aggregates (a soil structure feature that inhibits erosion)."[39] Additionally, a study found the carbon content in the soil of Nicaraguan shade-grown coffee farms revealed to be 18% higher than that of sun-grown farms.[40] Leaf litter and tree roots also help to retain soil moisture. For instance, studies of soil in sun-grown coffee farms had 42% lower moisture levels than farms with heavy shade.[41]

Lastly, the canopy created by shade trees and the natural mulch created from the fallen leaves leads to lower weed densities. While in open-sun conditions, weeds thrive. The weeds in these sunny environments must be controlled through herbicides and more intensive labor. Overall, tree roots, vegetation complexity at the canopy level and leaf litter deposits play a huge role in maintaining soil health.

3.5.2 Water Conservation and Management

The canopy created by shade trees impacts water cycling by improving infiltration, reducing surface runoff and increasing water retention. Infiltration rates are the rates at which water on the ground surface absorbs into the soil. Shaded coffee farms can maintain high infiltration rates, resulting in significantly less runoff of surface water, which is important for soil moisture and plant growth, because there is. For example, in Nicaragua, infiltration rates in sun coffee plantations decreased by 75% over a six to ten-year period.[42] In Sumatra, Indonesia, plantations converted from sun to shade-grown noticed improved infiltration and a recharge of subsurface water resources. Furthermore, higher precipitation capture and increased soil moisture result in wetter leaves and lower temperatures for the heat-sensitive coffee plants.

[39] Ibid.
[40] Ibid.
[41] Ibid.
[42] Rice, "The Ecological," Smithsonian's National Zoo & Conservation Biology Institute.

Additionally, the presence of trees in coffee plantations conserve water supplies. In shaded farms, greater water retention is important for replenishing the local watersheds. Unlike sun-grown coffee, shade-grown coffee does not require input of numerous chemicals, especially nitrogen fertilization, which in turn contribute to the pollution of watersheds due to runoff. As a result, shaded coffee farms experience three times less leaching of nitrates into the groundwater supply. In lieu of chemical fertilizers, shade coffee farmers incorporate nitrogen-fixing trees in to their agroecosystems, which "can put up to 100kg of nitrogen per hectare per year into the soil, potentially reducing the amount of fertilizer a farmer would have to apply by 25 to 30%."[43] Sun-grown coffee farms face significant repercussions such as soil erosion, acidification, and water pollution, all of which have a massive impact on the environment.

Interestingly enough, studies have found that coffee agroecosystems impact the health of other ecosystems. For example, in Puerto Rico, the sediment and agricultural run-off from sun-grown coffee farms caused damage to nearby coral reefs. To protect the islands pristine reefs, over forty farms participated in the Natural Resources Conservation Service's sun-to-shade initiative. The transition of many farms to shade-grown resulted in more resilient reefs and profitable coffee farms resulted from the transition to shade-grown farms.[44] In summary, trees in agroecosystems protect the quantity and quality of water via rainfall interception, increased infiltration, and improved watershed dynamics.

3.5.3 Carbon Sequestration

Shaded trees in coffee plantations help keep excess carbon dioxide out of the atmosphere by sequestering carbon in their wood. Carbon dioxide is sequestered in the above ground biomass–the limbs, trunks, and leaves–and the below ground biomass–the roots–of shade trees.

[43] Ibid.
[44] National Oceanic and Atmospheric Administration, "Shade-Grown Coffee Protects Coral Reefs in Puerto Rico," NOAA Coral Reef Conservation Program, http://coralreef.noaa.gov/aboutcrcp/news/featuredstories/may15/shadecoffee.html.

The biomass linked to shade trees in coffee agroforestry systems act as "carbon sinks." Carbon sinks are natural systems that store carbon dioxide from the atmosphere. The soil also acts as a sink; soil incorporates carbon from the detritus as it breaks down over time. In a study on shade-grown coffee systems in Indonesia, researchers found that soil carbon stocks (soil and biomass) in the upper soil layer constituted 60% of those found in primary forests there, and they possess 58% more total carbon stock in soil and biomass than sun-grown coffee.[45] Moreover, the presence of trees in shade-grown coffee farms mitigate carbon dioxide in the atmosphere, which impacts climate change.

3.5.4 Climate Regulation

Climate change poses an immediate threat to coffee production, as coffee is very sensitive to changes in temperature. Scientists predict that the average global temperature will increase by 2.3-3°C by 2050.[46] In addition, the Intergovernmental Panel on Climate Change predicts that by 2050 there will be a 10 to 20% decline in global crop yields, with the greatest impact in tropical regions of the world.[47] More specifically, a study on 7,000 farmers in Mexico and Central America forecasts that by 2050, coffee areas will shrink by as much as 30% because of global warming.[48] Therefore, it is crucial to act now to alleviate the degradation of the environment by human behavior that further promotes climate change. The optimal solution to reverse a rise in temperatures in coffee plantations is through the addition of shade trees. Trees in shade-grown coffee farms act as a buffer against future temperature increases caused by climate change. The trees act as insulators for the coffee plants, protecting coffee from frost, while also decreasing the temperature around the coffee berries by up to 4°C (7.2°F) during warm weather.

[45] Lily Kubota, "Why Does Shade Matter?," The Specialty Coffee Chronicle, last modified April 10, 2012, http://scaa.org/chronicle/2012/04/10/why-does-shade-matter/.
[46] https://phys.org/news/2016-09-global-2c-threshold.html
[47] Thurston, Morris, and Steiman, *Coffee: A Comprehensive*, 35.
[48] Ibid., 31.

For instance, a study in Costa Rica determined that 40-60% shade coverage helped to control leaf and air temperatures below or near 25°C (77°F).[49] Moreover, the shade trees lower wind speeds, soil temperature and number of coffee pests. In conclusion, shaded coffee farms can buffer against temperature and humidity fluctuations caused by climate change, providing a more stable microclimate.

3.5.5 Pest Control

The high fauna diversity found in coffee agroecosystems allows for dynamic food webs to form. These organism interactions are an important aspect of the overall ecological workings in a healthy environment. Shaded coffee farms attract birds, bats, ants, lizards, and other organisms that serve as natural pest control against coffee pests.

The coffee berry borer (*Hypothenemus hampei),* coffee's most feared pest, is an insect whose larvae savagely devour the seeds inside the coffee berries. The coffee leaf miner (*Leucoptera coffeella*) is an Arabica coffee pest found in every coffee producing country. These moth larvae feed on the coffee leaves, leading to their ultimate death. The coffee leaf miner and coffee berry borer (CBB) affect the coffee crop in three ways: (1) drop in the yield of the coffee plant; (2) the quality of the beans is reduced; (3) and the shrub will not live as long.

Birds provide an ecological service by acting as a biological control agents against herbivorous insects. Biological control by birds in shaded coffee farms will be addressed in detail later in this paper. While birds control insects during the day, bats are important arthropod predators at night. A study in Chiapas, Mexico found that in the absences of bats from the coffee plants, harmful arthropod density on coffee increased by 84% during the wet season. The predatory potential of bats and birds represents significant value to farmers, as their presence

[49] Ibid., 37.

improves yields by between 1-14%, which constitutes a monetary value between $44-$105 and $75-$310 per hectare per year.[50]

Ants and spiders can also reduce the damage caused by the coffee leaf miner and the coffee berry borer. Ants feed on the borer at all stages of their life. For example, a study in Apia, Colombia examining three shade and three sun coffee plantations found that shade farms attracted sixteen ant species to the coffee borer, while sun farms attracted only twelve species. Given this disparity, the value of shade cultivation and the attraction of ground-dwelling ants to borer adults is clear.[51] In another study, researchers found that the exclusion of lizards in shaded coffee farms led to an increase in leaf miners. In summary, birds, bats, arthropods, and amphibians supply must needed pest reduction services in shade-grown coffee farms.

3.5.6 Pollination

Pollination, a basic biological process crucial to the survival and variability of plants bearing flowers, results in positive advantages for humans as well. Defined as the movement of pollen from the anther, the male portion of the flower, to the stigma, the female portion of the flower, the act occurs with the help of a variety of insects, namely bees bearing the greatest significance.[52]

Bees are of special importance in tropical regions, because most plants in these areas rely on pollination via animal assistance. Coffee Arabica is a self-pollinating crop; however, recent studies revealed that the coffee plant itself, as well as other crops, produce a more predictable or an even larger fruit yield in areas with larger bee variety.[53] Additionally, shade systems that

[50] Estrada et al., "Bat Diversity," 352.
[51] Cristina Gallego and I. Armbrecht, "Testing Ant Predation on the Coffee Berry Borer in Shaded and Sun Coffee Plantations in Colombia," *Entomologia Experimentalis Et Applicata* 124 (September 2007): 261, Academic OneFile.
[52] Anand Titus and Geeta N. Pereira, "Honey Bees as Coffee Pollinators," Eco-Friendly Coffee, last modified June 1, 2016, https://ecofriendlycoffee.org/honey-bees-coffee-pollinators/.
[53] Shalene Jha and J. H. Vandermeer, "Impacts of Coffee Agroforestry Management on Tropical Bee Communities," *Biological Conservation* 143 (2010): 1423, ScienceDirect.

operate near natural forests enhance the pollination process and the resulting fruit yield. Fruit set is a term describing whether flowers on a plant or tree produce fruit or not after pollination. A study in Indonesia revealed that a higher bee species diversity increases the fruit set in coffee (60% fruit set when visited by three species while 90% fruit set when visited by twenty species or more).[54] In addition, a study in Costa Rica found that "increased fruit set due to enhanced insect pollination at a per bush level improved coffee yields by more than 20% in one 1100-hectare farm, worth an estimated $62,000."[55]

Many bee species are attracted to coffee agroforests that harbor a variety of flowering plants other than coffee, leading to an increase in the fruit set of these plants. The variety of tropical tree species on shaded coffee farms allows the bees to gather nectar from other plants. In short, increased shade encourages a wider diversity of pollinating insects, which in turn leads to higher fruit set in the coffee and thus higher yields.

3.6 Conclusion

Overall, shade-grown coffee farms provide a viable habitat for a many diverse species of flora and fauna. By using agroforestry shade-grown coffee farmers are able to create an environment that conserves soil and water, sequesters carbon dioxide, regulates microclimates, provides pest control services, and increases pollination.

[54] Rice, "The Ecological," Smithsonian's National Zoo & Conservation Biology Institute.
[55] Jha et al., "Shade Coffee," in *BioScience*, 423.

Chapter 4

The Rise of Sustainable Coffee

4.1 The Specialty Coffee Boom

In recent years, there has been a rise in the number of labeling and certification programs responding to environmental standards in a variety of commodity areas. Eco-labels identify and reward products or services produced under preferable environmental and social conditions, each within a specific product or service category. Sustainability labeling certifications are intended to support consumers' purchase choice by explicitly communicating the presence of sustainability labels on consumer products. Eco-labels are not merely "green" symbols; they are credible labels given by an impartial third party.[56]

Certification and labeling initiatives have seen the most growth in the food industry because of its relation with health and nutrition concerns. Environmental concerns around the world led to the differentiating commodities based on management practice. Coffee is one of "the first internationally traded products where collective efforts were undertaken to develop standards on processes that address socio-economic and environmental concerns."[57] The coffee industry one of the leading industries for sustainability certification initiatives and as a result, coffee became the model for other commodity groups. The next paragraph will discuss how differentiation in the coffee market led to the rise of sustainable certification programs.

In the 1960s, the consumption of coffee stopped increasing. Mainstream coffee, dominated by a few large-scale roasters, was in the decline stage of its product life cycle. In the 1970s and 1980s roasters faced a decline in global coffee prices. The tendency of consumers to

[56] Ellen J. Van Loo et al., "Sustainability Labels on Coffee: Consumer Preferences, Willingness-to-pay and Visual Attention to Attributes," *Ecological Economics* 118 (October 2015): 216, ScienceDirect.
[57] W. Vellema et al., "The Effect of Specialty Coffee Certification on Household Livelihood Strategies and Specialisation," *Food Policy* 57 (November 2015): 15, ScienceDirect.

"stretch" coffee (Americans extracted around one hundred cups from a pound of coffee in the early 1990s) and the growing concern that coffee was bad for one's health caused major price shocks.[58] Furthermore, coffee became a standardized product; the average consumer was not able to taste the difference between brands. In response, companies shortened roasting times and used lower quality beans to save on costs.

In 1982, the Specialty Coffee Association of America (SCAA) was created. The early SCAA members defined specialty coffee as "good preparations from unique origin and distinctive taste."[59] Now specialty coffee is defined as coffee grown in special geographic microclimates with little to no defects, while possessing a full body taste. Throughout the 1980s and 1990s, the SCAA aimed to change consumers' views of quality by building a loyal customer base and spread awareness of darker roasts and Arabicas. The SCAA commented:

> *Coffee consumers have been moving away from price-based purchasing to a purchasing trend that focuses on product variety and quality… [This] has evolved coffee from a beverage of pseudo-commodity characteristics to one with cultural and sensory ties.*[60]

Over the next few years, the United States saw a growth in specialty coffee. Specialty coffee shops and cafés popped up almost overnight. Differentiation occurred in order to offer an array of quality choices. The rise of specialty coffee in the 1990s ultimately lead to another trend in the coffee market: the sustainable coffee buzz.

4.2 Coffee with a Conscience: Sustainable Coffee

During the rise of environmentally conscious consumers, the coffee market further differentiated itself to address consumers' concerns of social and environmental production standards. As discussed, consumers' consumption habits changed as they began to understand

[58] Gregory Dicum and Nina Luttinger, *The Coffee Book* (New York, NY: New Press, 2006), 150, ProQuest Ebook Central.
[59] Benoit Daviron and Stefano Ponte, *The Coffee Paradox: Global Markets, Commodity Trade, and the Elusive Promise of Development* (New York, NY: Zed Books Ltd., 2005), 152.
[60] Ibid.

the "interconnected nature of the global biosphere."[61] As a result, labeling programs were started to market the "green," sustainable coffee. The objective of the labeling system was to convey information about production processes and their environmental and social effects. Specialty coffee was then differentiated based on sustainability labels. There are two main types of environmental labels: third-party labels and private labels. Private labels such as Nespresso AAA certification and Starbucks' C.A.F.E. focus more on maintaining a minimum quality of their coffee beans.[62] For the purposes of this paper, only third-party labels will be discussed, which are generally viewed as more legitimate. Sustainable coffee addresses issues including health concerns related to consuming chemical residues, social inequalities, wage uncertainties due to volatile coffee prices, and environmental conservation. There are five indicators of sustainable coffee: (1) certification; (2) country of origin; (3) botanical variety; (4) roaster; (5) and price.

This paper will discuss selected specialty coffee differentiated based on third-party labels: organic, Fair Trade, Rainforest Alliance, Bird Friendly, and Utz Kapeh. Below are brief summaries of some certification system, as well as a detailed chart (Table 2) comparing the main features of each sustainable coffee certification.

Conventional	Differentiated
Commodity price pressures	Consistently higher prices
Reward for quality and price	Reward for quality and process
Easy market access	Limited market access
Intense competition	Moderate competition
Gov support: subsidy, ext, R&D	Limited government support
Broad market size	Very limited market size
Short learning & cost curve	Longer curve: certification, etc

Table 1: Comparison of conventional and differentiated markets[63]

[61] Dicum and Luttinger, *The Coffee*, 179.
[62] Ibid.
[63] Daniele Giovannucci, "The State of Sustainable Coffee: A Study of Twelve Major Markets," International Institute for Sustainable Development, last modified July 2003, http://www.iisd.org/pdf/2003/trade_state_sustainable_coffee.pdf.

4.3 Organic Coffee

Organic coffee farming techniques seek to enhance soil quality and promote biodiversity. Organic set the precedent as the first sustainability standard established for agriculture. According to the World of Organic Agriculture 2016 report, coffee represents the biggest single organic crop in the world. However, coffee comprises only two percent of all organic cropland. Organic chemicals are those found in nature, while non-organic chemicals are those manipulated in a laboratory or a factory. Technified coffee farms rely heavily on insecticides, herbicides, synthetic fertilizers, fungicides, and nematocides to support higher yields, while presenting serious health and environmental concerns. Harmful agrochemicals commonly used in conventional coffee farming include, endosulfan, DDT, chloropyrifos, malathion, and benzene hexachloride.[64] Unfortunately, large coffee brands such as Folgers and Dunkin Donuts, who by most of the world's coffee, source their conventional coffee from intensified plantations. Furthermore, the International Federation of Organic Agriculture Movements (IFOAM), the organic umbrella organization, unifies organic standards, accredits certifiers, and verifies practices around the world. In the United States, coffee sold as certified must be produced under standardized conditions established by United States Department of Agriculture's (USDA) National Organic Program (NOP). USDA-accredited organizations, like the Organic Crop Improvement Association (OCIA), verify farms. Farms may be certified organic if they meet the following standards and procedures: (1) no use of prohibited agrochemicals on the land for the prior three years; (2) a required buffer between the coffee and other crops grown inorganically; (3) farmer-detailed plans that show methods that prevent soil erosion; (4) annual inspection of all methods and materials by a third-party certifier; (5) farms must be in compliance with organic

[64] Julie Craves, "Pesticides Used on Coffee Farms," Coffee & Conservation, last modified December 15, 2006, http://coffeehabitat.com/2006/12/pesticides_used_3/.

practices; (6) detailed records of materials and methods used in coffee production and management plans; (7) and other sustainable agricultural criteria.[65]

Organic certification represents a true commitment to sustainability. Organic coffee farmers manage a healthy soil base, fertilize with compost, and avoid use of allowed substances (naturally-occurring toxins that are less toxic in recommended doses than synthetics), until demonstrated necessary. Organic methods aid in reducing the billions of noxious chemicals placed into ecosystems annually. Because coffee roasting heats the beans up to 400°F, all non-organic residues burn off. The benefit of organic coffee is not that consumers ingest fewer chemicals or that organic coffee taste better, but rather, the people and the environment at origin benefit.[66]

Many farms may be considered "passive organic," but do not hold certification. Although some farms practice sustainable methods and forgo chemical use, they may not have the financial resources to pay the certification fees and additional incurred costs. Obtaining organic certification is a significant commitment for many farmers in developing countries. And issues concerning costs and corruption in certification thwart some farmers from seeking certification.[67]

4.4 Fair Trade Coffee

Fair Trade primarily focuses on lessening poverty through greater equity in international trade. It is defined as "an alternative approach to conventional trade that aims to improve the livelihoods and well-being of small producers by improving their market access, strengthening their organizations, paying them a fair price with a fixed minimum, and providing continuity in

[65] Daviron and Ponte, *The Coffee*, 168.
[66] Julie Craves, "The Power of Organic Coffee," Coffee & Conservation, last modified December 8, 2016, http://coffeehabitat.com/2016/12/scaa-organic-coffee/.
[67] Julie Craves, "What Does 'Organic' Really Mean?," Coffee & Conservation, last modified August 4, 2011, http://coffeehabitat.com/2011/08/what-does-organic-really-mean/.

trading relationships."[68] Throughout most of the world, the Fairtrade Labeling Organizations International (FLO) governs the Fair Trade certification. However, Fair Trade USA governs the certification in the U.S. Under Fair Trade USA, coffee estates and individually-owned farms can acquire certification. Yet, under FLO, only democratically-organized cooperatives of small producers can obtain certification. Fair Trade co-ops in developing countries establish a minimum price per pound and coffee grown organically adds a premium on top of the minimum. The initiative aims to pay farmers enough to maintain a higher quality of life. Although coffee was the first FLO-certified commodity, the certification has now expanded to many different well known commodities such as sugar, rice, bananas, mangoes, tea, pineapples, chocolate, and cut flowers.[69] While this certification helps to alleviate poverty, it does not address criteria regarding growing coffee under shade, and the standards related to conserving wildlife remain minimal.

4.5 Shade Coffee Certification Programs: Rainforest Alliance & Bird Friendly

There are two shade initiatives: Rainforest Alliance (RA) and the Smithsonian Migratory Bird Center's (SMBC) Bird Friendly. These shade certification programs attempt to connect economic and environmental goals by encouraging shade production through the addition of a premium to the coffee price. This simultaneously limits forest degradation and enhances biodiversity.[70]

The Rainforest Alliance, a New York City based nonprofit organization, promotes standards for sustainability. Its certification program covers many different crops, including coffee. The Rainforest Alliance aims to address several ecological issues and includes some

[68] Daviron and Ponte, *The Coffee*, 173.
[69] Dicum and Luttinger, *The Coffee*, 195.
[70] Yasuyuki Todo and Ryo Takahashi, "Coffee Certification and Forest Quality: Evidence from a Wild Coffee Forest in Ethiopia," *World Development* 92 (April 2017): 158, ScienceDirect.

general labor standards, including upholding minimum wage laws in developing countries. RA standards do not require farmers to grow crops organically, nor do the standards address any criteria for shade management. Many criticize the certification for having such lenient criteria, which may not be making a major environmental impact. This is a process-oriented certification, meaning that RA grants certification to farms working toward the criteria. Since farms merely work toward the criteria, there is currently no definitive way to measure what benchmarks have been achieved. In addition, while the RA is overall a beneficial organization, after the standards update in 2017, it is important to understand that some Rainforest Alliance certified coffee may actually come from sun-grown coffee farms. The other certification system for shade coffee is the simultaneously Smithsonian Migratory Bird Center's Bird Friendly coffee, which will be discussed in detail in the following chapter. The SMBC certification is considerably stricter. Moreover, having two different shade certifications in the market, with varying standards, adds to confusion in ways that adversely impacts both systems.

4.6 Conclusion

The wave of specialty coffee led the way into another emerging trend: the sustainable coffee buzz. In the marketplace, the three primary offshoots of "sustainable" coffee are organic, Fair Trade, and shade-grown coffee. While each has a different focus, they all aim to provide benefits for coffee-growing areas, farmers, and consumers.

Table 2: Features of selected sustainable coffee certifications

Certification Name	Organic	Fair Trade	Rainforest Alliance	Bird Friendly	Utz Certified
Mission	Create a sustainable management system that improves and promotes biodiversity and soil health	Protect and enhance the livelihoods of struggling farming families through direct trade, fair prices, and community development	Conserve biodiversity and secure sustainable livelihoods through community development, productive land use practices, and workers' rights	Promote, appreciation, understanding, research, and protection of neo-tropical migratory bird populations. Emphasizing certified shade coffee as a viable alternative habitat birds and other organisms.	"To create a world where sustainable farming is the norm." Vision is that farmers apply good agricultural practices, the food industry invests and rewards sustainably grown products, and products meet consumer's standards
Year Established	19th century; first certification in 1967	1970s; certifications administered since 1998	1992; first certification in 1996	1997	1997; first certification in 2001
Standard Setting Organizations or Actors	International Federation of Organic Agriculture Movements (IFOAM) and affiliations (i.e. USDA)	Fair Trade Labeling Organizations International (FLO) and other Fair Trade Guarantee Organizations	Rainforest Alliance (RA)	Smithsonian Migratory Bird Center (SMBC)	Utz Kapeh Foundation
Marketing Characteristics	Focus: all markets Market access: established/reliable market Strategy: mainstream marketing; consumer labels used	Focus: all markets Market access: established/reliable market Strategy: mainstream marketing; consumer labels used	Focus: global, Market access: buyers and markets still limited, but increasing Strategy: mainstream marketing; consumer labels used	Focus: all markets Market access: buyers and markets still limited, but increasing Strategy: mainstream marketing; consumer labels used	Focus: specialty and mainstream Market access: buyers and markets still limited, but increasing Strategy: mainstream marketing; consumer labels often used

Certification Name	Organic	Fair Trade	Rainforest Alliance	Bird Friendly	Utz Certified
Promotion and Communication	Business to consumer. Backed by federal governments. Consumer groups, suppliers, and some certifiers communicate benefits to consumers	Strong promotional efforts to consumers and businesses through awareness campaigns, media and on-product labeling	Business-to-business and consumer marketing, communications, and media outreach undertaken by RA staff. Business to business, on-product labeling and off- product promotion backed by the Rainforest Alliance	Business-to-consumer; business-to-business Popular, trade, and academic articles	Business-to-business and on-product labeling
Production Strategy	Mostly small farmers; some plantations	Small and medium farmers	Mostly plantations; some small farmers	Mostly small farmers; some plantations	Mostly plantations; some small farmers
Production Specifications	Standards against GMOs, chemically treated plants, land clearing restrictions, and use of synthetic pesticides, fungicides, and herbicides (three years prior to certification)	Standards for reduction and composting of wastes, reduction in agrochemical use, prevention of fires, limited use of GMOS, and promotion of soil fertility	200+ criteria; standards for conservation of natural resources, ecosystems and wildlife. Also, integrated crop management, and integrated management of wastes. Use of agro-chemicals restricted and managed	Organic certification Biophysical criteria: shade cover, canopy structure, floristic diversity, soil management, vegetational buffer zones	Criteria on fertilizer use, waste pollution management, integrated pest management, soil management; standards for primary and secondary forests

Certification Name	Organic	Fair Trade	Rainforest Alliance	Bird Friendly	Utz Certified
Social Production Specifications	No standards	Standards for democratically run, politically independent and small farmers Standards for upholding 10 ILO conventions (no forced or child labor, no unequal pay, freedom from discrimination, rights to healthy and safe working conditions, and minimum social and labor conditions) Minimum floor price guaranteed for workers	Standards for fair treatment and good conditions for workers upholding key ILO conventions (no forced or child labor, unequal pay, and freedom from discrimination) No minimum price guaranteed to workers Workers' rights benefits (health and safety) and community relations	No standards	Standards upholding eight ILO conventions (no forced or child labor, no unequal pay, freedom from discrimination, minimum social and labor conditions, and rights to association and collective bargaining)
Monitoring Procedure and Accreditation	Inspection frequency: annually Monitoring body: private certifiers regulated by state and accredited by IFOAM; USDA required for certifiers of organic product sold in U.S.	Inspection frequency: annually Monitoring body: independent non-profit certifier and private certifier (Fair Trade inspector) approved by initiative annually	Inspection frequency: annually Monitoring body: certification and inspection by biologist teams, sociologists, agronomists and other specialist approved by the Sustainable Agriculture Network	Inspection frequency: every three years along with organic inspection Monitoring body: certification and inspection by USDA accredited organic certification, inspectors trained by SMBC	Inspection frequency: annually for farms and roasters using logo; 10% shadow/surprise audits Monitoring body: private certifiers approved by initiative (accredited to ISO 65 standard).

Certification Name	Organic	Fair Trade	Rainforest Alliance	Bird Friendly	Utz Certified
Producer Fees	Pay certification sometimes and monitoring costs	Pay certification and monitoring costs. FLO assists financially restricted producers by offsetting costs	Pay certification and inspection fees, although occasionally paid for by buyers	Organic certification fee. Pay certification fee and periodic audit costs. Per diem cost for inspection added with organic inspection. Additional small symbolic fee for certificate	Pay inspection fees
Buyer Fees	Certification costs if required by certifier. Fees from USD $700 to $3000	USD $500 importer fee and Fair Trade Minimum Price. Also, if requested by co-ops, up to 60% of pre-harvest financing. Roasters pay a Fair Trade Fee per pound ($0.10¢)	Participation Fee for importers ($0.015¢ per pound of green coffee purchased)	USD $100 per yr. paid by importers to use BF logo USD $0.25¢ per pound paid by roaster of coffee roasted and sold as Bird Friendly®. These fees support bird conservation research	USD $0.012¢ per pound paid by "first buyers," and passed along through the supply chain
Price Premium	USD $0.10¢ to $0.40¢ per pound (+/-); if organic coffee is produced under Fair Trade contract, receive around $0.15¢ per pound	Minimum price of USD $1.40 per pound (washed Arabica) plus a $0.20¢ premium, and additional $0.30¢ if certified organic	No minimum price set. Around $0.05 to $0.10¢ per pound, also the initiative helps farmers in other ways	No minimum price set. Around $0.05 to $0.10¢ per pound, plus organic premium	No minimum price set. USD 6¢ per pound (Arabica) $50 per metric ton (Robusta)
Production (metric tons)	248,000	83,007	458,058	3524 (2014), 4989 (2017)	362,873

Certification Name	Organic	Fair Trade	Rainforest Alliance	Bird Friendly	Utz Certified
Origin Countries	40+ countries	29 countries	42+ countries	Mexico, Bolivia, Guatemala, Nicaragua, El Salvador, Colombia, Ecuador, Peru, Venezuela, Honduras, Ethiopia, Thailand, Galapagos Island of San Cristobal	23 countries
Labor Inputs	High	High	High	High	Moderately high
Additional Income Possibilities	Selling other organic products from farm; income diversification	Selling other Fair Trade products; indirect impact through establishment of new links with wider trade networks	Selling fruit and forest by-products; eco-tourism	Selling fruit and forest by-products; eco-tourism	Selling fruit and forest by-products
Logos/Eco-Labels					

Sources: Adapted from *The Coffee Paradox, Sustainable Coffee Certifications: A Comparison Matrix,* and *Regulating Sustainability in the Coffee Sector, Norms for Production, Processing and Marketing of "Bird Friendly" Coffee* and *Coffee & Conservation.*

Chapter 5

What is "Bird Friendly Coffee"?

Hiking through the Monteverde cloud forest in Costa Rica, one may be able to see a Resplendent Quetzal, a Golden-winged Warbler, or one of 367 other bird species.[71] Although, many hikers never actually spot much of the wildlife in rainforests, they do hear the harmonic chorus of birds amongst the trees. These birds lie at the heart of the discussion over coffee production and its adequate approaches, as the question frequently arises: Should all coffee be cultivated under the shade protection provided by trees?[72]

In the mid-1990s, biologists recognized a marked drop in populations of various tropical migratory songbirds.[73] Shaded agroforests in Latin America were found to provide an important wintering habitat for migratory birds, such as warblers, orioles, swallows, swifts, thrushes, and vireos and residents including tinamous, parrots, trogons, becards, toucans, and woodcreepers."[74] These neo-tropical migrants travel from their breeding grounds in the United States and Canada, then fly south to winter in Latin America. Further research linked the loss of bird richness and abundance to the coffee intensification trend.[75] Between 1978 and 1987, the U.S. Fish and Wildlife Service's Breeding Bird Survey revealed a one-to-three percent drop in neo-tropical migrants yearly.[76] Sun coffee production eliminates the protections provided by shade coffee production, which explains why species diversity decreases in sun coffee systems. In fact, studies

[71] "Monteverde Area Bird Checklist," Exotic Birding, http://www.exoticbirding.com/costarica/monteverde/checklist.html.
[72] Pendergrast, *Uncommon Grounds*, 365.
[73] Dicum and Luttinger, *The Coffee*, 193.
[74] Robert Rice, "Why Migratory Birds are Crazy for Coffee," Smithsonian's National Zoo & Conservation Biology Institute, last modified January 1, 1994, https://nationalzoo.si.edu/migratory-birds/news/why-migratory-birds-are-crazy-for-coffee.
[75] Peter Bichier and Stacy M. Philpott, "Effects of Shade Tree Removal on Birds in Coffee Agroecosystems in Chiapas, Mexico," *Agriculture, Ecosystems & Environment* 149 (March 2012): 171, ScienceDirect.
[76] Ibid.

conducted in both Colombia and Mexico recorded 94-97% fewer bird species in sun coffee plantations versus shade coffee plantations.[77] Bird extinction risk increases with deforestation, as habitat loss affects 89% of threatened birds worldwide.

The protection provided by shade trees can function as a habitat for birds for a season or throughout the entire year. To obtain and retain a plethora of bird species, the structure of the canopy must vary extensively. Shade coffee is among the most bird-friendly of agricultural habitats.

5.1 The History of Bird Friendly Coffee

In 1991, the Smithsonian Institute established the Smithsonian Migratory Bird Center (SMBC) in an attempt to better understand and inspire protection of habitat for neo-tropical migratory birds in Latin America.[78] In response to the serious decline neo-tropical migratory birds in the 1990s, the SMBC conducted a number of scientific studies in Peru, southern Mexico, and Guatemala. The SMBC discovered that birds used traditional shade-grown coffee plantations as rest stops. Further research showed that the declines in bird populations were linked to the coffee technification trend. Soon after this major discovery, the SMBC sponsored the First Sustainable Coffee Conference in 1996. At the conference, the SMBC developed the rigorous standards for shade-grown, organic "Bird Friendly" (BF) coffee. In 1997, the SMBC launched the BF certification program: a certification system for the production, processing, and marketing of shade-grown, organic coffee.[79] Coffee certified as Bird Friendly by the SMBC is the only 100% organic and shade-grown coffee certification available.

[77] Ibid.
[78] Giovannucci, "The State," International Institute for Sustainable Development. 52.
[79] Dicum and Luttinger, *The Coffee*, 193.

The SMBC states that criteria for "Bird Friendly" coffee aim to:

I. Guaranteeing environmental sustainability, with the aim of protecting and/or improving the ecological indicators of environmental health.
II. Protecting structural as well as species biodiversity, in order to guarantee shelter and food for birds, especially migratory ones.
III. Taking into consideration that coffee cultivation must be integrated into agroforestry systems.
IV. Keeping in mind that the forest transformed for coffee production must not be part of any protected zone or natural reserve.
V. Guaranteeing that the application of production techniques must leave intact specific ecosystems and contribute to the conservation and sustainable use of natural resources.
VI. Permitting cultural practices involving the use of epiphytes for ceremonial or festive purposes.
VII. Keeping documentation describing the unit and demonstrating the management of the plantation and shade.[80]

Unlike the Rainforest Alliance certification, the SMBC Bird Friendly is considered to be the most rigorous shade certification. For instance, the criteria used by the SMBC, at the minimum, allows certification for diverse commercial polycultures, while less diverse commercial polycultures do not receive certification. In addition to a current organic certification by a USDA accredited certification agency, BF coffee farms must adhere to the criteria in the table (Table 3) below.

The most critical and important criteria include: a minimum canopy height of 12 meters; a species list of at least ten trees in addition to the major "backbone," *Inga* species; at least 40% foliage density; and three shade strata that provide structural diversity.

Listed below are terms provided by The SMBC to aid in understanding the biophysical criteria chart for Bird Friendly coffee (BFC) below.

Arboreal or forest coverage or canopy: Foliage above the coffee bushes

[80] Smithsonian, "Norms for Production, Processing and Marketing of "Bird Friendly®" Coffee," Smithsonian Migratory Bird Center, https://nationalzoo.si.edu/scbi/migratorybirds/coffee/Norms-English_1.pdf.

Stratum (plural is "strata"): Layer, or series of layers, each on top of the other, formed by the difference in the height of the trees that compose the arboreal canopy.

Structural diversity: Distribution and ordering of the strata in profile. The varied "architecture" of the arboreal canopy that displays differing heights of two or more strata. Ecologically, a more diverse system, with various layers, and vegetation types (trees, epiphytes, vines, old snags, etc.), provides a greater number of physical niches for organisms.

Backbone species: The most common or predominant species (sometimes a single genus represented by several species), forming the principle stratum of shade in the canopy and often a large fraction of all individual trees present.

Native species: Species found within the area of its natural geographical distribution.

Floristic diversity: Mix of species or diversity of shade trees and other plants.

Bird Friendly coffee: Certified organic shade grown coffee, whose bio-physical characteristics of the shade component meet or exceed the criteria laid out below.[81]

Biophysical Criteria	Criterion
Vegetation Cover	Foliage cover: at least 40%, usually during the dry season and after pruning, must have sufficient coverage all year round to create a microclimate that protects the coffee farm from dry winds and rain Composed of different shade strata: *emergent stratum*: composition of native trees (must be 20% of the total volume of the shade foliage), *main stratum*: backbone species and others of similar height (must be 60% of the total volume of the shade foliage), and *lower stratum*: (must be 20% of the total volume of the shade foliage) Unacceptable backbone species: *Gliricidia sepium, Grevillea robusta, Erythrina* spp*., Albizzia* spp*. and Pinus* spp*.* Visual characterization: at least a "Traditional polyculture" (refer to Figure 3)
Structural Diversity	Visible strata: obvious layers of shade; a lower stratum and an upper stratum, three strata are required Backbone species height: at least 12 meters high and pruning in a certain way to preserve height Upper stratum: trees must be at least 15 meters high, must be native trees

[81] Ibid.

Biophysical Criteria	Criterion
Floristic Diversity	Backbone species: 60% or less of all the shade trees (foliage volume), must be native species, the principle canopy Woody species: 40% of shade trees (emergent layer and lower stratum each 20% of the foliage volume), at least 10 different species, of which each species must represent 1% or more of all shade trees Tree species distribution: mixed well throughout the farm Epiphytes: promote the growth of orchids, ferns, bromeliads, mistletoe, and parasitic plants Detritus: leave some trunks and dead limbs to supply habitats for certain insects and birds Pruning practices: must have only a minimal impact on mosses, lichens, and epiphytes. Not allowed to prune to create a thin canopy appearance Herbaceous species: herbs, forbs, or weeds should be present; no minimum percentage required
Soil Management	Soil: must be covered year-round, with either mulch or living cover Soil conservation practices: must be performed on sloping terrains, as well as areas that are broken and susceptible to strong rains Leaf litter: should be present, no minimum percentage required, but soil needs protecting by leaf litter and living cover
Vegetational Buffer Zones	Buffer zones: must be present and maintained next to streams, rivers, lakes, and areas subject to erosion Living fences: must maintain a border strip of natural vegetation along borders such as, roadways. At least 5 meters wide on each side of streams is required and 10 meters wide along rivers

Table 3: Bird Friendly criteria[82]

[82] Ibid.

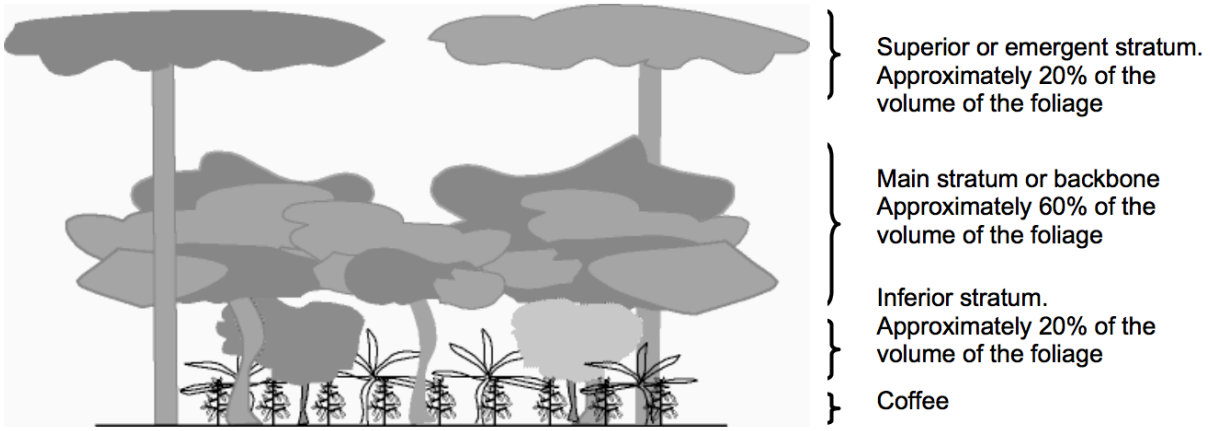

Figure 6: Shade strata and volume of foliage cover[83]

5.2 A Symphony of Birds Inside Shade Coffee Forests

Shade coffee-growing regions provide safe havens for migratory birds, especially given the decimation and diminishment of their habitats in Latin America and North America. Amongst the tropics, the shade coffee farms possess some of the highest levels of migratory bird species and some of the largest bird populations. Researchers surveying birds in Mexico and the Caribbean Basin determined that these biodiversity-friendly coffee and cacao plantations provide habitation for more forest-dependent migratory birds than any other farming operation.

The SMBC's fact sheet, "Why Migratory Birds are Crazy for Coffee," states:

> *In the regions most heavily used by migratory birds—Mesoamerica, the Caribbean islands, and Colombia—coffee plantation "forests" cover 2.7 million hectares, or almost half of the permanent cropland.*
>
> *In southern Mexico, coffee plantations cover an area over half the size of all of the major moist tropical forest reserves, providing critical woodland habitat in mid-elevation areas where virtually no large reserves are found.*[84]

[83] Ibid.
[84] Rice, "Why Migratory," Smithsonian's National Zoo & Conservation Biology Institute.

Coffee often provides the last refuge for a variety of bird species and other species that lack solid protection elsewhere. These birds thrive and feed in the overstory of the shade plantations, not the coffee. The coffee shrubs themselves offer few resources. This is why sun coffee monocultures do not support a diversity of birds.

5.3 Understanding Neo-Tropical Birds

Neo-tropical migratory birds, which typically breed during the summer in the United States or Canada and spend their winters in Mexico, Latin America or South America, represent more than 200 species.[85] Although most migratory species are songbirds, others are raptors, waterfowl and shorebirds. The distances that neo-tropical migratory birds travel during the migration process greatly depend upon birds of the same species, as opposed to variation in the species alone. Although some birds migrate from the Southern region of the United States to Mexico or the Caribbean, which measures less than five hundred miles round-trip, others venture to South America at round-trip distances of approximately 14,000 miles.[86]

The willingness to travel so far stems from their pursuit of food, as birds travel to locales that offer plenty of nourishing food options and lack the restrictions that more northern locations face. Given when the migrations take place, these birds seek areas where necessary resources remain available despite an influx of birds from northern regions. Their main food sources include caterpillars, flying insects, fruits and nectar, which decrease rapidly in colder months.

Ultimately, migratory birds move south for the purposes of breeding, as more offspring can thrive given such relocation practices. Besides readily available food sources, the reasons behind increased bird survival include extended daylight hours, wider dispersion and safer

[85] Mary Deinlein, "Neo-Tropical Bird Basics," Smithsonian's National Zoo & Conservation Biology Institute, last modified January 1, 1999, https://nationalzoo.si.edu/migratory-birds/news/neotropical-migratory-bird-basics.
[86] Ibid.

habitats for cultivating the young. For a more in-depth explanation of neo-tropical migratory birds refer to SMBC's article, "Neo-Tropical Bird Basics."[87]

Since migratory birds acclimate better to new environments, they thrive more in coffee plantations than resident birds that lack seasonal movement. The ability to adjust enhances the migratory experience, especially since the coverage provided by shade-grown coffee plantations mirrors that of natural forests. Although some birds integrate into coffee plantation habitats rather easily, others struggle to adapt, especially when the monoculture of sun-grown coffee production replaces the intricacies of the native forest.[88] The Smithsonian Migratory Bird Center's article "Bird List" provides a detailed list of all migratory species that have been discovered in coffee farms.[89] These birds are either forest generalists or specialists (species that can thrive only in a limited range of environmental conditions), including: frugivores, insectivores, nectarivores, omnivores and granivores. Two important songbirds are described below.[90]

[87] Ibid.
[88] Ibid.
[89] "Bird List," Smithsonian's National Zoo & Conservation Biology Institute, https://nationalzoo.si.edu/migratory-birds/bird-friendly-coffee-bird-list.
[90] ScienceDaily, "Birds Do Better in 'Agroforests' Than on Farms," ScienceDaily, last modified August 7, 2012, https://www.sciencedaily.com/releases/2012/08/120807101357.htm.

Scarlet Tanager:

The Scarlet Tanager, a songbird native to the eastern deciduous forest, migrates to Mexico and Central America en route to the Andes for the winter season. The shrinking population of the Scarlet Tanager serves as the focus of the Cornell Lab of Orinthology's Project Tanager, which documents the songbird's decline from formerly prominent habitats along the East Coast of the United States.[91]

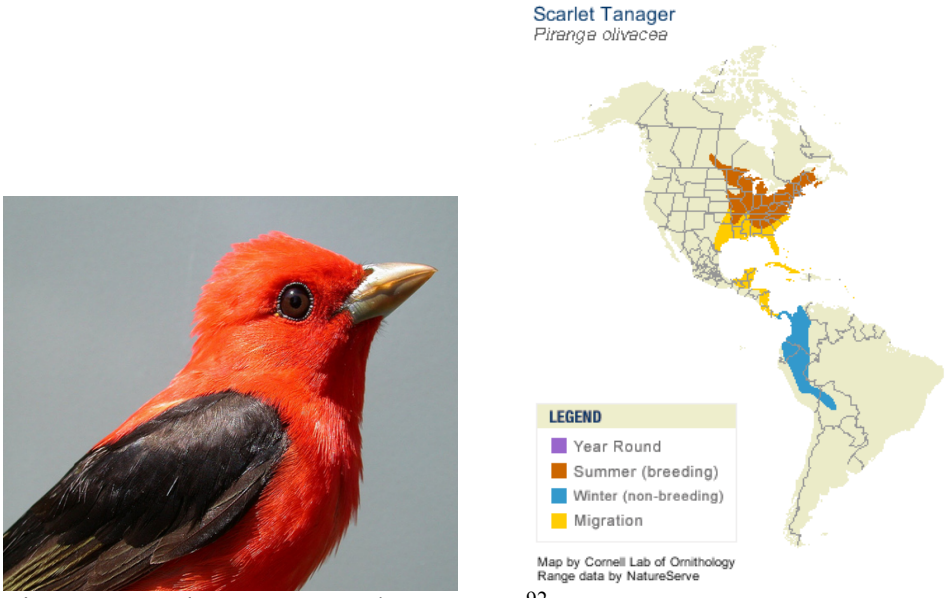

Figure 7: Scarlet Tanager and range map[92]

[91] Smithsonian, "Bird Friendly Coffee Slideshow," Smithsonian's National Zoo & Conservation Biology Institute, https://nationalzoo.si.edu/migratory-birds/bird-friendly-coffee-slideshow.
[92] Julie Craves, "Know Your Coffee Birds: Scarlet Tanager," Coffee & Conservation, last modified November 23, 2011, http://www.coffeehabitat.com/2011/11/coffee-bird-scarlet-tanager/.

Baltimore Oriole:

The Baltimore Oriole, a songbird that thrives amongst shaded coffee plantations, enjoys the nectar of and insects near flowering shade trees. Given the Oriole's rapid decline over the past two decades, as determined by the Breeding Bird Surveys, researchers suggest that the destruction of native forests in favor of open lands from the transition from shaded to sun coffee plantations explains the decrease in their population.[93]

Figure 8: Baltimore Oriole and range map[94]

5.4 Migratory Birds and Bird Friendly Coffee Farms

Bird Friendly certified farms support a healthy ecosystem and supply critical habitats for resident and migratory birds. As a general rule, managing more trees as shade cover in coffee provides better habitat and supports a more diverse wildlife community than managing fewer trees. Studies comparing Bird Friendly and non-Bird Friendly coffee farms reveal that Bird Friendly farms produce healthier environments that in turn aid in enhancing biodiversity.[95]

[93] Smithsonian, "Bird Friendly," Smithsonian's National Zoo & Conservation Biology Institute.
[94] Julie Craves, "Know Your Coffee Birds: Baltimore Oriole," Coffee & Conservation, last modified July 9, 2009, http://www.coffeehabitat.com/2009/07/coffee-birds-baltimore-oriole/.

The notable article, "The Ecological Benefits of Shade-Grown Coffee: The Case for Going Bird Friendly," by the SMBC's states:

> *A study in southern Mexico found nearly 60% of forest birds make use of BF farms, compared to only 40% in non-BF farms.*
>
> *Coffee plantations in southern Mexico (Chiapas) offer habitat for 180 species of birds (46 being migratory), a richness rivaled only by natural forest habitats in the region.*
>
> *Birds overwintering on BF-quality farms in Venezuela showed improved body condition (compared to those in forests in the area) during their time there, a critical issue for making the journey north in the spring. This finding is likely a result of the availability of more small-fruited plants useful to birds and plant flowers that attract insects, offering a buffet of resources.*
>
> *Up to 65% of Cerulean Warblers banded one year in Venezuela returned to the same coffee plantations the following year, emphasizing the importance of quality habitat (shade-grown coffee) and site fidelity (repeated use of a habitat in migratory birds).*
>
> *BF-quality farms in the Venezuelan Andes were shown to support up to 14 times the density of migratory birds compared to local primary forest (likely due to a greater abundance of bird-dispersed, small-fruit tree and shrub species, as well as more flowering plants that attract insects).*[96]

In order to conduct a bird census, researchers in each study noted above use a technique called mist netting. Mist nets resemble volleyball nets and are invisible to birds and bats. As the birds fly into them, they become briefly entangled, allowing skilled researchers to safely disentangle them without any injury to the bird.[97] Below is a personal photo from my mist netting experience while on a study abroad in Costa Rica.

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[95] Marja H. Bakermans et al., "Migratory Birds Use of Shade Coffee: The Role of Structural and Floristic Features," *Springer*, April 11, 2011, 85, ScienceDirect.
[96] Rice, "The Ecological," Smithsonian's National Zoo & Conservation Biology Institute.
[97] Axelson, "In Colombia," Cornell Lab of Ornithology.

Figure 9: Hummingbird captured in a mist net[98]

5.5 Ecosystem Services Provided by Birds

Aside from the obvious aesthetics of their thrumming chorus and vibrant plumage, birds play a vital role for the environment and farmers on shade-grown coffee farms as they provide ecosystem services, such as: eating insect pests, spreading seeds and pollinating crops.

5.5.1 Pest Control

Biological control created by birds acting as predators on pests plays a critical role in reducing damage by devastating coffee pests and by increasing income to growers. Birds prey on the crop's two main pests–coffee berry borer and coffee leaf miner–and display greater predation in more shaded coffee systems. The coffee berry borer causes damage to coffee estimated at half a billion dollars annually.[99] Combating the CBB with pesticides proves difficult, because the pests live underneath the protection of the coffee berry's seed coat and their constant evolution increases their resistance to chemicals. Furthermore, endosulfan the most common pesticide use to control the CBB, poses significant health risks as a highly toxic substance, so the pesticide

[98] Laura Rathmell, *Mist Net,* photo, 2015, digital file.
[99] Stefan Lovgren, ed., "Are Birds Best Hope for Pest-Ridden Coffee Crops?," National Geographic, last modified August 26, 2008, http://news.nationalgeographic.com/news/2008/08/080826-jamaica-coffee-birds-missions.html.

remains banned in many countries.[100] Research conducted in Jamaica confirms that migratory insect eating warblers, including Black-throated Blue Warblers, American Redstarts and Prairie Warblers, provide the best defense against the CBB. In fact, the study found migratory birds responsible for 73% of the predation incidences. These birds feed on the pests, which subsequently reduces crop damage and limits economic losses.[101] Similarly, in Costa Rica, the reduced damage of the ripening coffee berries increased a grower's income by $310 per hectare annually in 2013.[102] Overall, multiple studies conclude that birds provide an ecological service by acting as biological control agents against economically significant pests.[103]

5.5.2 Seed Dispersal and Forest Regeneration

Fruit-eating birds are extremely important as facilitators of seed dispersal in tropical ecosystems. A recent study in Chiapas, Mexico, which analyzed the gene flow of the understory tree, *Miconia affinis,* revealed that traditional coffee farms maintain genetic connectivity with common tropical landscapes and can serve as foci for forest regeneration.[104] The researchers sought to explore how seed dispersers on shade coffee plantations act as corridors and the healthy distribution of genes in trees. Birds, like the Clay-colored Robin and the Chestnut-sided Warbler, carry *Miconia* seeds, which permits seed dispersion. The researchers asserted, "Shade coffee farms support extensive dispersal processes crucial for the connectivity of remnant forest and agricultural habitats….and the colonization pattern and high genetic diversity of *M. affinis*

[100] Daniel S. Karp et al., "Forest Bolsters Bird Abundance, Pest Control and Coffee Yield," *Ecology Letters*, August 4, 2013, 1, ScienceDirect.
[101] Steven F. Railsback and Matthew D. Johnson, "Effects of Land Use on Bird Populations and Pest Control Services on Coffee Farms," *PNAS* 111, no. 16 (April 22, 2014): 6109, ScienceDirect.
[102] Karp et al., "Forest Bolsters," 1.
[103] Thurston, Morris, and Steiman, *Coffee: A Comprehensive*, 45.
[104] Shalene Jha and Christopher W. Dick, "Shade Coffee Farms Promote Genetic Diversity of Native Trees," *Current Biology* 18, no. 24 (December 23, 2008): R1126, https://www.ncbi.nlm.nih.gov/pubmed/19108765.

points to the role of shade coffee farms as a potential foci of native forest regeneration."[105] Moreover, shade coffee farms possess the potential to promote forest regeneration in the future, as the lands are commonly cultivated for a century or less. The possibility of regenerating forested lands through avian assistance, in addition to maintaining habitat integrity and genetic diversity, explains the need for shade-grown coffee farms.

5.5.3 Pollination

While birds are more important as seed dispersers, they also serve as pollinators. Pollination of flowering plants by birds is known as ornithophily. Bird pollinated flowers tend to be colorful, large, often tubular and secrete copious amounts of nectar. Hummingbirds and honeycreepers directly participate in the pollination process of coffee and other plants. In conclusion, birds provide critical ecosystem services, such as: pest control, seed dispersal and pollination.

5.6 The Ecological Benefits of Bird Friendly Coffee

In addition to all the ecological benefits of shade-grown coffee discussed earlier, since Bird Friendly coffee farms follow the strictest environmental criteria; any benefits of shade are enhanced in BF farms. Scientist has long known the benefits of shade-grown coffee plantations for resident and migratory birds. But are BF farms more than just bird-friendly?

A recent study in Mexico investigated the strong connection between small mammals, birds and coffee plantations. Researchers found that BF farms provide an important refuge for an array of small mammals. The study explored mammal diversity and population levels of mammals across various coffee-growing environments in Chiapas, including: sun coffee

[105] Ibid., R1127.

plantations, traditional shade coffee plantations, Bird Friendly shade coffee farms and natural forest. After analyzing the differing types of environments, researchers determined "Bird Friendly coffee groves had, on average, greater numbers of individual animals, particularly small rodents, and a higher variety of species than conventional shade coffee or sun coffee plantations."[106] Species diversity, a point of interest for the study, increased in areas with plants that spanned from only a few inches up to approximately three feet. Plant height and organic growing provide perceived connections between environment and mammal species diversity. Farmers desiring greater species diversity for mammals on their farms should consider the findings of the Smithsonian Migratory Bird Center.[107]

In addition to mammals, studies in Mexico revealed that between 40% and 56% of forest ants were found in BF farms, compared to only 26% to 30% in non-BF farms.[108] Increased ant diversity indicates a healthy environment and ants help control pests. In short, because the BF initiative is considered by industry experts to be the most rigorous shade certification, all the positive impacts of shade will be enhanced, benefiting not only birds, but also other species.

5.7 Other Explanations for Bird Abundance on Bird Friendly Farms

Although varying levels of structural diversity in the canopies of coffee plantations are critical for maintaining high bird abundance and diversity, epiphytes also play a critical in supporting avian biodiversity. Shaded coffee plantations consist of trees that harbor epiphytes such as orchids and bromeliads, which enhances bird species diversity. Epiphytes provide birds

[106] Robert Rice and Amanda Caudill, "Do Bird Friendly® Coffee Criteria Benefit Mammals? Assessment of Mammal Diversity in Chiapas, Mexico" [PLoS ONE], *Smithsonian Conservation Biology Institute*, November 26, 2016.
[107] Michelle Donahue, "Bird Friendly Coffee Gives a Paw-Up to Small Mammals as Well," Smithsonian Insider, last modified March 1, 2017, http://insider.si.edu/2017/03/mice-mocchato-bird-friendly-coffee-gives-paw-small-mammals-well/.
[108] Rice, "The Ecological," Smithsonian's National Zoo & Conservation Biology Institute.

with nesting materials and nesting sites, as well as food, such as: flower nectar, fruit, water and insects.[109] In Latin America, the deliberate removal of epiphytes from shade trees is a common management practice. Epiphyte elimination simplifies the agroecosytem, which can negatively impact avian communities. The SMBC requires positive management to promote epiphyte growth. A study in Mexico supported by BF funds found that "birds like the Bush-Tanager are five times more likely to emigrate from a shade-grown coffee farm without epiphytes compared to a farm with epiphytes."[110] In addition, epiphytes play an indirect role in maintaining the abundance of birds by influencing microclimate conditions. When epiphytes were removed, canopy cover and soil moisture were reduced, while running water increased. Increased rain through-fall could flood nests and affect ground nesting birds, such as Golden-crowned Warblers and Rusty Sparrows.[111] Likewise, because of increased canopy openness, birds may be more susceptible to detection by predators. Overall, shade coffee plantations containing epiphytes boast increased avian diversity and larger individual populations.

5.8 Suggestions to Improve Bird Friendly Coffee Farms

Coffee agroforests serve as conservation reservoirs of tree species native to nearby forests; however, the composition of tree species on shade-grown farms differs from native forests. Bird Friendly certified farms mimic forests and the SMBC points out the genus *Inga* as an important shade tree for plantations. The initiative cites that eight different native species of *Inga* spp. attract far more avian species than do non-native species of shade trees. In addition, the SMBC describes *Ingas* as legumes that fix nitrogen and are covered with epiphytes that provide

[109] Cruz-Angon and Greenburg, "Are Epiphytes," 151.
[110] Rice, "The Ecological," Smithsonian's National Zoo & Conservation Biology Institute.
[111] Thurston, Morris, and Steiman, *Coffee: A Comprehensive*, 46.

food for birds.[112] The dominance of *Inga* in coffee agroforests occurs because of institutional pressures and encouragement. A study conducted in Chiapas, Mexico found that farmers preferred *Inga* spp., and this genus accounted for 45% of all trees in coffee farms, which differs greatly from native forests, where *Inga* only has an 11% occurrence.[113] It is important to note that *Inga* species contribute little nitrogen through fixation and there is no significant difference in yields compared to other shade trees. Furthermore, coffee agroforests harbor a lower proportion of trees of conservation concern. Conservation organizations and governments promoting conservation through the implementation and integration of coffee agroforestry must recognize the variation in species common to such systems, as opposed to those common to native forests. Moreover, differing coffee agroforestry management practices should be promoted, such as downplaying the value of transitioning native forest canopies to canopies primarily featuring *Inga*.[114] Focusing on sustainability would enhance the motivation for conservation and would increase the attention on coffee agroforests. The promotion of coffee agroforestry should "include workshops in coffee farming communities that discourage the replacement of diverse canopies with Inga and that encourage tolerance for a greater number of adult tree species".[115] Farmers need to understand that other tree species besides *Inga* provide adequate shade. The SMBC should stress that the height of shade cover is more important for birds than the types of native trees. To attract more birds, BFC farms should plant more small-fruited plants useful to birds and flowering plants that attract insects.[116] In order for BFC agroforests to more closely mimic native forests and provide a suitable habitat for multiple

[112] Smithsonian, "Bird Friendly," Smithsonian's National Zoo & Conservation Biology Institute.
[113] Valencia et al., "The Role," 160.
[114] D. J. Douglas et al., "The Importance of Native Trees for Forest Bird Conservation in Tropical Farmland," *Animal Conservation* 17, no. 3 (June 2014): 264, Wiley.
[115] Ibid., 161.
[116] Rice, "Fruits From," abstract.

species, the farmers need to be motivated to transform their coffee agroforests to be less *Inga*-dominated, while also steering them away from planting trees used as wood products.

5.9 Conclusion

Bird Friendly coffee farms contribute to the sustainability of the environment and the conservation of natural resources. They protect species diversity and provide a safe haven and food for all types of birds. Birds provide vital ecosystem services such as pest control, seed dispersal, pollination and most importantly forest regeneration. Overall, the BF certification is known as the "gold standard"– the best available benchmark for coffee certification.

Chapter 6

The Social and Economic Sustainability of Shade-Grown Coffee Farms

Despite continued efforts to enhance sustainability practices, research repeatedly shows that the farming industry remains volatile and hunger and poverty are persistent in many farming communities. For coffee growers in many countries, coffee provides their sole source of income and so premiums earned for sustainable certifications can create appreciable differences. For coffee to be successful in the long term, it is not enough for coffee production and processing to become environmentally sustainable. Coffee production also needs to be socially and economically sustainable.[117] Shade-grown and organic coffee seeks to provide economic benefits; however, in this chapter, the degree to which these certifications deliver on the promise of measurable economic benefits will be analyzed considering the advantages and disadvantages. Furthermore, this chapter aims to answer the question: Are Bird Friendly certified farms profitable for farmers? I will then provide suggestions for improving the financial viability of BF farms. For the purposes of this chapter, I will be discussing all types of shade-grown coffee. It's important to remember the difference between various shade-grown practices versus the strictest shade-grown initiative: Bird Friendly.

6.1 Livelihood Benefits of Growing Shade-Grown and Organic Coffee

6.1.1 Price Premiums

Shade-grown and organic coffee provide farmers with access to specialty markets that reward shade-grown coffee and organic coffee with premium prices. Organic certification

[117] Tucker, *Coffee Culture*, 109.

provides farmers with a price premium ranging from ten to twenty-five cents per pound. Not only do shade-grown beans fetch a premium for either Rainforest Alliance of Bird Friendly certification, but they also for their higher quality beans. Because the coffee beans mature slower under the forest canopy, it leads to larger beans with a better, higher quality flavor profile. The price premiums for shade-grown coffee vary depending on the certification and if farms have multiple certifications (refer to Table 2 for premium prices). BF farmers receive around five to ten cents per pound and an additional premium on top of that for their organic certification. Additionally, the BF and RA certifications allows farmers to negotiate a better price. Yet, unlike Fair Trade, there is no minimum price set. In summary, as an incentive for protecting the environment, coffee farmers earn a premium above market price for their coffee beans.

6.1.2 Diversification: The "Shadow Economy"

Agroforestry systems harbor a variety of plant-derived goods and these goods serve various purposes that extend beyond the cultivation of the primary crop. In addition to producing coffee, a host of other products can be harvested from a coffee farm such as timber, fruit and fuelwood. Yet, their importance "often goes unnoticed, consisting what is a shadow economy alongside the recognized coffee production." [118] Despite downplaying the value of these other goods, the subsequent income can notably assist small-scale coffee producers. Moreover, by diversifying their production, coffee farmers become less susceptible to price drops in the global coffee market, as the other goods produced can sustain them during down periods. In addition to increased income, these other crops provide food for home consumption, limit soil erosion, provide a haven for pollinators and predators, and improve fertilization.

[118] Robert A. Rice, "Agriculture Intensification within Agroforestry: The Case of Coffee and Wood Products," *Agriculture, Ecosystems and Environment*, July 28, 2008, 213, ScienceDirect.

Furthermore, Robert Rice, of the Smithsonian Migratory Bird Center, conducted a study on wood products harvested from 338 coffee agroecosystems in Peru and Guatemala and showed that the shade component generates a socioeconomic benefit to smallholders. The study determined the percentage of income (either from direct consumption or from market sales) in totality that was earned from products other than coffee. One fifth to one third of the total income came from shade-derived products. The study revealed significant difference in how farmers exploit the hardwood species: some lumber used for construction and some used as fuelwood. The value of non-coffee products was based on local market prices, so when prices and yields are higher for coffee, farm income increased and the percentage of value derived from non-coffee products was lower (in Guatemala just under 19%, in Peru, 28%).[119] Overall, agroforestry systems are economically less risky than sun grown coffee farms because income is spread over several crops.[120]

A comparison study on small coffee growers' use of fruit derived from the coffee agroforestry systems in Peru and Guatemala reveals differences in use or in sale of the fruit. Fruits (bananas, avocados, mango, citrus fruits, etc.) produced on shaded coffee farms comprise only approximately ten percent of the farmers' total income, but can generate needed income for most farmers. Socioeconomic conditions and coffee landscapes that differ significantly in geography explain the differences in the fate of those fruits. In Guatemala, farmers sell a greater percentage of the fruits they produce, because they are more tied into a market economy (better road networks), while Peruvian farmers sell less and consume more of their fruits. Even though Guatemalans sell more, there is a tremendous loss of potential benefits that could be realized from the fruits: a 60% loss value. Both Guatemalans and Peruvians lose more fruits than are used

[119] Ibid.
[120] Ibid.

or sold, "with Guatemalans foregoing more than three times the dollar value per hectare than Peruvians ($151/ha vs. $44/ha)."[121] From an economic perspective, it is confusing why rural farmers do not take advantage of selling fruits for additional income. To survive, these farmers relied on other sources of income such as income from other family members, off-farm work, loans, and other crops (e.g. sugarcane, coca leaves). Some farmers may rely more on cash crops that require less maintenance than fruits. The study sheds light on rural farmers' minimal reliance upon fruits and possibly their firmly established ways of surviving– not primarily relying on other crops for additional income.

Income from fruits can play an important role in times of low coffee prices or periods when other income sources are scarce. Fruits contribute to the diet, income and general well-being of the farmers.[122]

6.1.3 Additional Economic Benefits for Shade-Grown Farmers

Shade-grown coffee farmers can benefit from reduced coffee production costs. Shade-grown coffee usually requires fewer chemical inputs. Moreover, shade production increases a farmer's productivity over the long run, because these farms are not subject to agro-chemical use and erosion. For instance, although hand weeding is time-consuming and expensive, the lack of herbicides allows farmers to let tree seedlings (spread by bats and birds) grow back and replenish the coffee farm over time.[123] Furthermore, coffee shrubs grown in light shade or in full sun have a shorter lifespan than those grown under shade. Farmers may also take advantage of their agroforestry systems to generate income through ecotourism– a form of tourism involving

[121] Robert Rice, "Fruits From Shade Trees in Coffee: How Important Are They?," abstract, *Agroforest Systems*, April 3, 2011, Smithsonian Migratory Bird Center, Smithsonian Conservation Biology Institute, National Zoological Park.
[122] Jefferson Shriver, "Bird Friendly Certification: Decidedly Good for Birds, But What About Farmers?," Daily Coffee News, last modified May 27, 2015, http://dailycoffeenews.com/2015/05/27/bird-friendly-certification-decidedly-good-for-birds-but-what-about-farmers/.
[123] Shriver, "Bird Friendly," Daily Coffee News.

visiting natural areas that conserve the environment. Since shade-grown coffee is more labor intensive, it generates more employment, meeting a critical need in many local communities. Local communities see an increased use of rural labor as well as, community organizational development. Price premiums, diversification, reduced chemical input, ecotourism and the longevity of coffee shrubs retain the interest of farmers in organic and shade-grown certification.[124]

6.2 Economic Costs of Shade-Grown and Organic Coffee

6.2.1 Corruption in Organic Certification

Robert W. Thurston, a well-known coffee connoisseur, interviewed many people involved in the coffee industry over the years. His research highlights some of the major issues within the organic coffee industry. An interview with coffee farmers in Costa Rica revealed that many times certifiers will give unfair certifications to non-organic farms just to receive the income from the fee. Other interviews showed that organic premiums do not compensate for the lack of yield and other problems associated with growing organic. Thus, because organic costs alone can be high, farmers also have reservations towards becoming shade certified.[125]

6.2.2 To Certify or Not to Certify?

Unfortunately, most coffee markets do not reward farmers for growing coffee in the shade. There is no market value assigned to shade. Bird Friendly farms represent a minor but noteworthy exclusion to common industry practice. Unlike the International Federation of Organic Agriculture Movements (IFOAM) or Fair Trade Labeling Organizations International (FLO), shade does not have a world organization to create common and well-defined practices

[124] Jose A. Gobbi, "Is Biodiversity-Friendly Coffee Financially Viable? An Analysis of Five Different Coffee Production Systems in Western El Salvador," *Ecological Economics*, no. 33 (2000): 271, ScienceDirect.
[125] Thurston, Morris, and Steiman, *Coffee: A Comprehensive*, 33.

for certifying shade systems.[126] Many opponents of such a certification system note that the term "shade" hinders acceptance, since the term is not definable amongst all production. Therefore, a switch to terms that denote friendliness with habitats or with ecosystems ("biodiversity-friendly") would potentially do more to acquire the necessary acceptance. However, others claim that such programs should be noted for how they protect the environment, in terms of slowing deforestation, which makes the terminology difficult to select.

According to the Sustainable Coffee Survey report, approximately 45% of companies claiming to produce shade-grown coffee were unfamiliar with the agency providing their shade certification.[127] The lack of accountability only grows when those importing, roasting, or selling the coffee claim to possess "verified shade" coffee, which lacks actual verification by a scientific method or via a certification process. Therefore, a clearly outlined and defined shade certification process represents the easiest way to identify such products on the market, while eliminating false shade claims in the process. Despite doubts about certification, the coffee industry agrees on the following four elements required for certification:[128]

1. The certification process should not financially hamper farmers' production.
2. Acquisition of certification should come with a premium price.
3. The development of criteria for certification should include the opinions of the producers themselves.
4. The certification process should use scientific data to prove that shade enhances biodiversity.

Although these tenets have been agreed upon, the absence of a collaborative effort to set shade coffee standards frustrates shade coffee producers. The high costs that accompany certification and the lack of a price premium discourage farmers from seeking such certifications.

[126] Daviron and Ponte, *The Coffee*,168.
[127] April Pojman, "Shade-Grown Coffee: Helping an Industry Turn Over a New Leaf," Fresh Cup Magazine, last modified May 2002, https://www.organicconsumers.org/old_articles/starbucks/shade_grown_coffee.php.
[128] Ibid.

In addition, a sad reality is that most certified coffee does not make it to the market as such and ends up being sold at conventional prices. This creates a risk for the farmers that they may not earn their premiums. In fact, according to the Sustainable Coffee Survey, of the 6.6 million pounds of coffee that were shade-certified globally in 2000-2001, only 2.1 million pounds were sold as such.[129] Coffee importers acknowledge that shade farmers often fail to obtain price premiums, but they argue that such labeling helps their coffee to sell faster. The speed through which shade coffee sells can be attributed to roaster selection, as roasters are more inclined to opt for certified-shade coffee over other unverified or non-shade production.[130]

As will be discussed below, the two shade certifications, Rainforest Alliance and the Smithsonian Migratory Bird Center, have very different standards for shade. There is a need to standardize the definition of shade to decrease the lack of transparency in the certification process.

6.2.3 Costs that Influence Coffee Certification

Third-party certifications comprise a small fraction of total global coffee production. Why is more coffee not certified as Bird-Friendly, Rainforest Alliance, etc.,? One reason is that certification is costly for many farmers. If the costs to acquire such certifications cannot be covered through price premiums, then farmers are unwilling to incur the additional costs.

> *A number of different types of expenses are involved in obtaining and maintaining certified status. Most producers will have to take steps to conform to the criteria outlined in the standards of the certification they are seeking. This can involve capital outlay, increased labor, etc. Then the farm or production unit has to pass an inspection by an auditor from an authorized certifying agency; these agencies typically charge a per diem fee plus transportation and other costs. There is usually a fee for the certification itself — to the certifying agency and/or to the organization that developed the standards (i.e.,*

[129] Ibid.
[130] Ibid.

Rainforest Alliance, Smithsonian Migratory Bird Center). Finally, all certifications require periodic audits and renewals, which incur costs.[131]

Below is a summary of fees, variables, and guidelines that show the cost of obtaining a certification for a farmer.

Costs to Meet the Standard

Each certification has a range of standards and rules that must be met, as some are stricter than others. Thus, most farms will have to change aspects of their farm to meet the criteria.

Organic certification requires that a farmer wait three years after ceasing the use of agrochemicals. Even though the farmer is technically producing organic crops, during the three-year conversion period, the farm may not sell crops as "organic" and therefore will not receive a price premium.[132]

The costs to meet the ecological criteria of some certifications are substantial. For a farm to comply with specific standards such as vegetational buffer zones, canopy cover, and soil conservation practices farms must spend a considerable amount of money. For instance, Rainforest Alliance has standards for improving and preserving the natural habitat. A study of two farms in Brazil revealed that "this cost was $10,000 to $50,000 for consulting fees, seed and plant material, planting, and management of these areas and there was the opportunity cost of losing this land from production."[133] As discussed previously, the Rainforest Alliance certification standards are not nearly as strict as BF. Thus, to meet the strict BF criteria, expenses are likely to be much higher than for farms adjusting to Rainforest Alliance standards.

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[131] Julie Craves, "How Much Does Eco-Certification Cost?," Coffee & Conservation, last modified April 11, 2011, http://www.coffeehabitat.com/2011/04/cost-of-eco-certification/.
[132] Jason Potts, Jessica van der Meer, and Jaclyn Daitchman, "The State of Sustainability Initiatives Review 2010: Sustainability and Transparency. International Institute for Sustainable Development," *A Joint Initiative of IISD, IIED, Aidenvironment, UNCTAD and ENTWINED*, November 2010, http://www.iisd.org/sites/default/files/publications/ssi_sustainability_review_2010.pdf.
[133] Ibid.

Likewise, costs to bring a farm into compliance with other standards are expensive and time consuming, especially for small farmers. For example, farms may need to set up a composting program, test soil, plant native trees, or construct wastewater treatment facilities. These additional efforts require labor, time and material outlay.[134]

While a farm may comply with all the initiatives standards, the farmer must also prove it through records and paperwork. For BFC, records must include information about the quantity of the shade-grown coffee harvested or sold. Despite time allocation for recordkeeping, such stringent guidelines often allow farms to increase efficiency and eliminate managerial waste. On the other hand, recordkeeping is difficult for many farmers with low literacy levels. After a farm has met the environmental criteria of a standard, farmers must then bear audit costs in order to become certified.[135]

Auditing Expenses

A certification agency must come and inspect the farms, audit records, and verify whether the farms meet the certifications requirements. There are many different agencies around the world, and some agencies can perform audits for multiple certifications. Three elements can impact the cost of an inspection.

First, the distance to travel to the inspection location and the condition of the roads. Travel costs and time factor into the total cost of the audit. Second, most auditors charge a per diem rate. This means that the size of the farm being inspected, as well as the speed the auditor works add to the cost. Therefore, the longer the auditor is on the property, the higher the total

[134] "From Bean to Cup: How Consumer Choice Impacts upon Coffee Producers and the Environment," *Consumers International and International Institute for Environment and Development*, December 2005, 64, http://www.consumersinternational.org/media/306514/coffee%20report%20%28english%29.pdf.
[135] Jason Potts et al., "The State of Sustainability Initiatives Review 2014: Standards and the Green Economy," The International Institute for Sustainable Development =, last modified 2014, http://www.iisd.org/sites/default/files/pdf/2014/ssi_2014.pdf.

cost will be. Lastly, the number of certification agencies accessible to the farmer's area influences the price of the audit. If there are multiple organizations in the area, then there will be more competition and thus, lower prices.[136]

Continuing Indirect Costs

Even after the certification has been awarded, there are annual on-going costs to retain the certification. Moreover, organic, of which Bird Friendly falls under, requirements include increased labor expenditures related to weeding, pruning and producing compost, in addition to pest control.[137] Finally, yield reduction is typical when transitioning away from traditional farming techniques, which represents an additional cost that can grow over time.

6.2.4 Specific Eco-Certification Costs

Organic Certification Costs

Direct costs to producer: The price of organic certification differs from organization to organization and depends on the time needed for preparation, travel, inspection, reporting and certification, and the fees the certification organization charge. Fee structures vary significantly. Some agencies charge a fee per hectare, others base them off the previous years' sales, and still others base fees off which or how many different countries the crop will be certified to sell to. Inspections themselves come with incremental fees, in addition to transportation costs for the inspector. Because the transition to organic production requires three years, annual inspections must occur during the first two years, prior to the awarding of the certification in the third year. Although the costs of these inspections and certifications are not meant to exceed 3-4% of sales, some coffee farms end up paying much more.[138]

[136] Craves, "How Much," Coffee & Conservation.
[137] Ibid.
[138] Potts et al., "The State," The International Institute for Sustainable Development, 172.

Potential annual direct costs: There are annual audits, as well as occasional random audits. In one example, "for a single producer with about 20 hectares of coffee, the cost was over $3,000 per year."[139]

Smithsonian Bird Friendly Certification Costs

Direct costs to producer: Bird-Friendly certified farms must pay for both organic and BF certifications. There are currently 27 companies and co-ops that certify farms as both organic and BF. These companies have been trained by SMBC staff on how to evaluate shade coffee systems. The SMBC's website states, "Since Bird Friendly certification also requires organic certification, combing the inspections *may* save you money."[140] Notably, the SMBC used "may" instead of "will." Per diem costs are also charged. In addition, BF farmers must pay a "symbolic" fee after inspection for a BF certificate. The total cost for the cooperative or farm is usually between $500 and $1500. Unlike RA, BF itself is less costly. However, farmers also have to pay for the costly organic certification. Growers should be able to enjoy hefty returns on the investment for certification, branding can bring fifteen-to-twenty-fold returns to growers.[141] However, this will only occur if the producers can cover costs and sell their crops to buyers looking for BFC.

Potential annual direct costs: BF certification lasts for three years, while organic certification lasts for only one year. Organic re-certification audits occur annually and are usually combined with BF certification audits every three years.[142]

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[139] "From Bean," 33.
[140] "Importers, Roasters and Distributors," Smithsonian's National Zoo & Conservation Biology Institute, https://nationalzoo.si.edu/migratory-birds/bird-friendly-coffee-importers-roasters-and-distributors.
[141] Laura Kammermeier, "Bird-Friendly Coffee: Why are YOU waiting?," Laura Kammermeier: Writer, Biologist, Digital Strategist, last modified January 26, 2011, http://laurakammermeier.com/bird-friendly-coffee-why-are-you-waiting/comment-page-1/.
[142] Craves, "How Much," Coffee & Conservation.

6.3 Additional Economic Disadvantages of Shade-Grown Coffee

6.3.1 Limitations of Diversification

Furthermore, the potential for income from the timber of shade trees is hampered by both ecological and economic issues. Certain tree species thrive more than others given the conditions and the competition for necessary nutrients and water. Selecting species that thrive best in these canopy conditions while simultaneously cultivating coffee is vital to the viability of the farmer's secondary income from timber. Along with adequate selection, specific knowledge about how to control canopy size for timber production and for crop efficiency is required. After addressing the ecological issues, economic problems may arise. Before considering timber production, the ability to bring the timber to the market, the value of the selected timber and the viability of the market itself must be considered. Since coffee production often occurs in rural areas, markets are difficult to reach, which makes the tree species selection even more critical.[143] In addition, the more valuable timber trees may take a long time to establish and grow.

Although diversification seems like a viable option for BF coffee farms, the certifications' strict shade criteria can inhibit the exploitation of wood products. BF certified farms require a minimal number of trees per unit area, so some farmers are not able to exploit these tree species if they want to keep their certification. This can lead to farmers exploiting nearby natural forests, which contributes to deforestation. However, to relieve pressure upon natural forests, "the incorporation of the timber products into the farm's certification could enhance the value of the timber derived therein."[144] This would lead to targeted timber extraction by the farmer while maintaining certification. Yet, it is important to note that incorporating timber products into the farm's certification will only result in limited timber extraction,

[143] Jezeer and Verweij, "Shade-Grown Coffee," 31.
[144] Rice, "Agriculture Intensification," 217.

compared to that of non-certified shade coffee farms. As discussed earlier, value from non-coffee products contributes greatly to the income of small-scale farmers. If BF farms are restricted by the certification's criteria, this negatively impacts the farmer's livelihood. This can hinder BF certified farms from being a viable option for small farmers, especially since they are not guaranteed a price like Fair Trade certified farmers. This could also be a reason why there are currently so few BF certified farms. If small farmers obtained the BF certification, their income would drop, so many farmers may refrain from the obtaining certification, even if their farms still provide a refuge for biodiversity. Coffee prices are extremely volatile; so, when prices are low, if BF farmers cannot exploit non-coffee products, BF farmers will be at a major disadvantage, and the shade itself will not positively contribute to the farmer's welfare.

6.3.2 Lack of Labor Standards for Bird Friendly Farms

Compared to Rainforest Alliance, Bird Friendly standards are not intended to address labor conditions. BF does not emphasize quality of housing, access to basic needs like water and electricity, or food security for farmers.[145]

6.3.3 Labor and Production Costs

If rigorous standards significantly increase the cost of production without compensation, then fewer producers will find the certifications worth it. Although workers are not exposed to harmful agrochemicals, shade-grown coffee farmers are susceptible to high production costs. For instance, at the Gaia Estate, a BF certified farm, applies a half-bucket of organic fertilizer to every plant, while its conventional coffee farming neighbors apply only a bottle cap of urea (nitrogen fertilizer). The time (converting manure, fallen branches, and coffee cherry residue into organic fertilizer) and expenses to make organic fertilizer increases the production costs

[145] "Bird Friendly Coffee," Ethical Coffee, http://www.ethicalcoffee.net/bird.html.

substantially.[146] In addition, this method of agroforestry is labor intensive. Instead of applying herbicides, shade-grown and organic plantations must hand weed, which is time consuming and expensive. The pruning of the shade trees and implementation of integrated pest management adds additional labor costs. Pruning practices are essential to allow some sunlight in for the coffee. However, pruning requires careful handling and must have minimum impact on the epiphytes, mosses and lichens. Gaia Estates verifies that "nothing is easy about regulating the shade trees 20 meters high."[147] Not only do the BF laborers manage the soil, vegetation buffers, and many other strict biophysical criteria, but also such picking requires demanding physical labor and requires experience.

6.3.4 Low Yield

Shade lowers coffee yield and delays ripening. For farmers seeking to be BF certified, they must accept the lower yields that will result from a higher density of shade.

6.4 Disadvantages for Farmers Seeking Bird Friendly Certification

6.4.1 Up-Front Expenses are Prohibitively Expensive

As discussed, there are many costs involved in obtaining Bird Friendly certification. Smaller operations lacking liquid capital require aid in covering the initial costs required for certification. Due to the range of variables involved in the cost of obtaining certification, it begs the question: Is obtaining certification worth it? Many producers are interested in being certified, but they cannot afford it. On the other hand, some producers can obtain it, but it may require years of effort and expense before they realize any return. The aforementioned potential for the absence of a price premium given the certification deters some farmers from ever seeking such a

[146] Birds and Beans Inc, "Gaia Estate – A Bird Friendly® Coffee Grower's Perspective," Birds and Beans, last modified September 27, 2012, https://birdsandbeans.ca/gaia-estate-a-bird-friendly-coffee-growers-perspective/.
[147] Ibid.

certification. Below is an excerpt from an article by Julie Craves in 2011 examining the issue of whether certifications are worth the costs.

> *80% of the farmers in in Nicaragua have less than 3.5 ha of coffee. The average yields organic small farmers are 329 kg/ha. Thus, the "typical" organic small-holder produces 2539 pounds of coffee. Let's give that farmer a very good price, reflecting current high prices and assuming it goes right to the farmer: $2/lb. That gives the farmer $5078 gross income for the year to provide for his family, pay for farm inputs and improvements, etc. The cost of the annual audit alone for organic certification puts a pretty big dent in that.*[148]

6.4.2 Organic Certification Wait-Period

Perhaps the most significant hurdle for coffee producers occurs during the waiting period for the transition to organic production, as the coffee being produced cannot be sold under the organic label for three years, so no premium is earned.[149]

6.4.3 Organic Coffee Not Receiving an Adequate Price Premium

Despite growing demand for organic coffee, the price buyers are willing to pay are not enough to cover the added costs of organic production. If the consumers are unwilling to pay steeper prices, then buyers refuse to incur the heightened costs. Without the price premiums, farmers tend to resort to traditional methods, since the costs of pesticides and other chemicals are less than the costs required to not only farm organically, but also to meet the criteria for certification and to pay for the certification itself. This can be an issue for farms that need to drastically alter their production methods to meet the BF and organic standards. However, despite the unwillingness to pay more for organic coffee, a Food and Agriculture Organization (FAO) report noted that in three studies, the quality of organic coffee is in fact correlated with its higher price.[150] Therefore, producers of high quality organic coffee can earn the price premium

[148] Craves, "How Much," Coffee & Conservation.
[149] Potts et al., "The State," The International Institute for Sustainable Development, 172.
[150] Ibid., 181.

and justify the costs, while lower quality organic coffee is often sold at conventional prices and defeats the purpose of organic production. Thus, if a farm already mimics a natural forest and does not need to plant more trees, then it is less likely that it will abandon organic farming and pursue BF certification because its coffee is already of higher quality.

6.4.4 Other Disadvantages of Bird Friendly Certification

Furthermore, there exist a limited number of certification agencies, and some can be not in close proximity to the coffee plantations seeking certification. This can increase the travel expenses the farms must pay for. In addition, intimate knowledge of the environment is required to manage the complex agroecosystems. Even though pollinators help increase coffee yields, overall the BF farms will have lower yields than sun-grown coffee plantations and farmers must accept this trade-off. Another disadvantage is that the only way BF farms will realize high returns is if they sell to roasters specifically looking for BFC and because most of the BF certified coffee does not make it to the market as such. Also, the strict standards for certification can make it easy for farmers to be denied BF certification, even if they are helping the environment in the same ways as certified farms. Lastly, many farmers argue that the price premium is not worth it, especially for farmers who are not Fair Trade certified and are vulnerable to the volatile coffee prices. These factors are very important for farmers who often are just trying to make ends meet.[151] This begs the question: Why spend so much money to convert to BF?

[151] Tucker, *Coffee Culture*, 109.

6.5 Are Bird Friendly Farms Profitable?

Through analyzing the advantages and disadvantages of bird friendly certification, I have concluded that it does not seem profitable for an individual small farmer to obtain BF certification. Burdens are proportionately higher for smallholders and the extra cost is not worth it as it cuts into their profit margin. Many times, organic certification alone is financially out of reach for small producers. However, it *may* be profitable for farmers that already have multiple certifications, BF being one of them. Yet, because of the financial burden on importers and roasters that causes them to not purchase BFC, many BF farmers are not realizing premiums and their coffee is not making it to the market as "Bird Friendly." Coffee farms that are already certified BF are often profitable when there are stable yields, production and climate. However, in a conversation with Fernando Lima, the owner of the BF farm Grupo Balcanes in El Salvador, told me in an email interview that BF is currently not profitable because of issues with El Niño and La Niña effect.[152] Overall, currently BFC is not profitable for small farmers; nonetheless if demand increases it may become more financially attractive to small farmers. While BFC has so many qualifying factors, the certification does not result in profits for farmers.

6.6 Recommendations to Improve the Financial Viability of Bird Friendly Farms

The challenges of shade-grown and organic coffee need to be addressed if certification is to deliver tangible and continued benefits for biodiversity and farmers. The financial viability of BF coffee farms can be improved through higher premiums, increased incentives for importers and roasters, diversification, local and global involvement, aid from NGOs and other private

[152] Fernando Lima, e-mail interview by Laura Rathmell, March 10, 2017.

companies, rewards for ecosystem services, building relationships, aid from consumers, conducting research and uniting objectives.

6.6.1 Higher Premiums

Farmers are more likely to benefit from Bird Friendly certification if they receive a higher net income and if costs can be better controlled and distributed. Premiums should be higher for shade-grown coffee, especially BF, than other certification programs that do not negatively affect yield.[153] The costs of complex certifications, in addition to diminished crop yields and higher labor costs due to certification requirements, fail to earn farmers the necessary premiums to justify them for both organic and BFC. These higher premium prices do not need to come from market forces alone (higher prices from consumers willing to pay for biodiversity friendly practices). Governmental or non-governmental conservation programs could provide funds for the price premium, which would improve farmers' returns without increasing the prices paid by the consumer. If these conservation programs do not provide funds, the high price for shade-grown coffee is ultimately paid by the consumer, which can negatively impact consumption of shade-grown coffee. Higher premiums could also be secured for the farmers by the importer themselves.[154] For example, Freeman Trading–a shade-grown and BF coffee importer–helps farmers by seasonally fixing an agreed price for its coffee. Thus, the farmers are being "protected from the huge fluctuations in the global commodity markets which can at times leave the producers facing a loss against ever increasing inflation rates and basic production costs."[155] Freeman Trading pays, on average, more than at least twice the cost of production, which significantly exceeds the global price. In addition, a higher premium will also reduce the

[153] Ivette Perfecto et al., "Biodiversity, Yield, and Shade Coffee Certification," *Ecological Economics* 54, no. 4 (September 15, 2005): 442, ScienceDirect.
[154] Ibid., 443.
[155] Freeman Trading, "Mission," Freeman Trading, https://www.freemantradingltd.com/mission.

incentive for farmers to abandon shade-grown practices and turn to less eco-friendly land uses. Most importantly, the price premiums for shade-grown coffee must be high enough for famers to seek certification. Higher premiums for BF certified coffee create income stability for growers.

6.6.2 Recommendations to Increase Incentives for Importers and Roasters

Many BF certified farms struggle to locate importers willing to purchase BFC because of the financial burden that it places on the players in the supply chain. If there are no importers looking for BFC, then the farmers earn no premiums for their cultivation practices. Importers pay $100 a year to use the BF logo and roasters pay twenty-five cents per pound to do so. The SMBC collects these fees to support bird conservation research and program costs. Only about 10% of the coffee grown and certified as BF enters the market as such, because many importers and roasters avoid paying the extra associated fees when they can sell the coffee as organic or shade-grown.[156] The entire supply chain needs to be certified, not just the farm, for the coffee to be sold as BF. All components of the supply chain must therefore value the importance of BFC. Increasing incentives for importers could include subsidizing or lowering the fees to achieve the BF label. However, most importantly, importers, roasters and consumers need to understand that the BF fees fund a worthy cause: bird conversation research and education.[157]

6.6.3 Recommendations for Diversification

Bird Friendly coffee farms require diversification to improve their livelihoods by increasing their overall productivity and diversifying their income to increase their resilience. If the small farmers have enough capital or support to plant non-coffee products or already have an

[156] Gustave Axelson, "Bird Friendly Coffee Now Available At A Major Retailer," Cornell Lab of Ornithology, last modified October 9, 2012, https://www.allaboutbirds.org/bird-friendly-coffee-now-available-at-a-major-retailer/.
[157] Teja Tscharntke et al., "Conserving Biodiversity Through Certification of Tropical Agroforestry Crops at Local and Landscape Scales," *Conservation Letters*, January/February 2015, 17, Wiley.

array of diverse crops to sell or consume, then diversification proves viable for BF farms. As discussed before, alternative income from non-coffee products (fruit, fuelwood, timber, cash crops) protects farmers from price fluctuations and provides income for other products in case of crop losses. Since coffee is a seasonal crop, diversification provides a steady income throughout the growing season and food for home consumption. Incorporating subsistence crops such as corn, beans, rice, etc., as well as landraces (locally adapted species of plant), can also guard against changes in precipitation patterns and can create resistance to hard weather.[158] Identifying the most beneficial crops produced on the farm proves critical in maintaining viability. Also, lower maintenance crops are essential for economic resilience, because managing coffee is already labor intensive. Another way to offset uncertain coffee prices is to plant crops that have high retail prices, in addition to providing adequate shade. For example, an eight-year study in Brazil found that by planting a specific Hawaiian variety of the macadamia tree can provide shade for the coffee shrub and an additional income stream simultaneously. The macadamia nut is often the world's most expensive nut, selling at upwards of $15 per pound. Researchers claim that this tree could make coffee 178% as profitable as coffee alone.[159]

Likewise, harvesting firewood is important for rural areas where electric or gas stoves are unavailable because of location or cost.[160] However, changes in the species composition of shade trees to provide wood products negatively impacts the conservation of important tree species, as well as bird abundance. Although the scientists at the SMBC proved and supported that wood products are critical for farmers, they come at the expense of the conservation potential of the coffee agroforest. For that reason, I do not support the transformation of coffee agroforests to

[158] Jezeer and Verweij, "Shade-Grown Coffee," 31.
[159] Dan Nosowitz, "This Tree Could Make Coffee Plantations More Profitable And More Environmentally Sound," Modern Farmer, last modified November 21, 2016, http://modernfarmer.com/2016/11/tree-make-coffee-plantations-profitable-environmentally-sound/.
[160] Bird Friendly Coffee Slideshow *Rice 2008*

provide wood products, because it decreases the species diversity and composition of the trees. The SMBC should clarify its objectives, in terms of whether the organization remains focused on conservation or on sustaining the livelihoods of its farmers.

Another way farmers could boost their incomes is by integrating apiculture (bee farming) into coffee systems. Honey collected from beekeeping in shaded coffee agroecosystems can yield a price premium in the market, because the honey comes from the flowers of multiple species.[161] Additionally, oyster mushroom farming from the waste from coffee growing could be another source of supplemental income. Overall, diversifying agricultural practices might create increased government participation through legislation and infrastructure, which would tackle problems related to poverty and food shortages.

6.6.4 Local and Global Involvement

Due to the cost of certification and land management can be costly, financial incentives and support should be provided by governments to mitigate the costs of growing Bird Friendly coffee, thereby contributing to the overall sustainability of coffee farming and farm productivity. Despite the key role agriculture plays in most countries and for most societies, most coffee growers lack assistance from their national governments. National governments must increase their involvement in supporting their citizens through subsidization of farms, since governments can provide financial assistance through subsidies and credits, while also offering certification and promotion programs that increase demand and subsequently market prices.[162] Government programs should also provide loans or subsidize farmers for the initial costs of the certification

[161] Gopikrishna Warrier, "Indian Farmers Boost Income and Biodiversity by Mixing Coffee with Honey," Revitalization News, last modified January 1, 2017, https://revitalizationnews.com/article/indian-farmers-boost-income-biodiversity-mixing-coffee-honey/.
[162] Gobbi, "Is Biodiversity-Friendly," 267.

process to increase participation. Likewise, government agencies should improve access to credit to pay for certification and production costs, while also providing tax relief.

For instance, Brazil's Companhia Nacional de Abastecimento (CONAB) purchases coffee from farmers through the Policy Minimum Price Guarantee (PGPM), which protects farmers from price fluctuations. Likewise, Brazil's government maintains other programs that provide lines of credit and subsidies to small coffee farmers, as well as programs that support sustainable projects aiming to preserve biodiversity. Colombia also provides direct subsidies to its coffee farmers.[163] Government entities should also provide crop insurance for coffee producers who grow in areas that are prone to volatile or treacherous weather conditions that can decimate entire crops or prevent cultivation altogether. For example, The Coffee Board of India, a government organization, provides such support.[164]

Furthermore, some government entities promote the restoration of shade-grown coffee and more should follow suit. For instance, USDA's Natural Resources Conservation Service (NRCS) provided financial and technical assistance to Puerto Rican coffee farmers for the conversion of their operations to shade-grown farms. NRCS launched the Shade-Grown Coffee Initiative and partnered with EnviroSurvey Inc. and the U.S. Fish and Wildlife Service to help plant more than 83,000 shade trees. NRCS assists in planting native trees and in creating habitat corridors.[165]

I suggest that the SMBC work with national and regional governments in producer countries, connecting them with local banking and finance. Together they can help small

[163] Word Press, "Shade Grown Coffee, Not Just for the Birds," Debating Science: The University of Massachusetts Amherst, last modified December 6, 2013, https://blogs.umass.edu/natsci397a-eross/shade-grown-coffee-not-just-for-the-birds-2/.
[164] Tscharntke et al., "Conserving Biodiversity," 15.
[165] Julie Wright, "Shade-Grown Coffee Yields a Better Product and Top-Notch Wildlife Habitat," United States Department of Agriculture: Natural Resources Conservation Service, last modified June 30, 2016, https://www.nrcs.usda.gov/wps/portal/nrcs/blogdetail/nrcsblog/home/?cid=nrcseprd1178206.

producers access to funding and credit, provide incentives to lower costs and barriers and training programs, and promote sustainable practices.

It is important to note that certification alone is not enough to bring more land into sustainable production. Certification alone "is not a substitute for government engagement; the two should reinforce each other."[166] However, not all governments possess expendable funds for such purposes and the upfront costs are substantial, so farmers may need to rely on NGOs, conservation groups and aid organizations for financial assistance.

6.6.5 NGOs, Conservation Groups, and Aid Organizations

Limited government assistance stifles farming operations in developing countries, where poor infrastructure and low liquidity make subsidization nearly impossible. However, the integration of private companies such as NGOs, conservation groups and aid organizations support biodiversity-friendly agriculture through private funding and initiatives. Many small, cash-poor farmers lack the monetary resources to pay for the certification costs, as well as other costs associated with growing shade coffee.[167] International NGOs and aid agencies from developed countries could assist with initial funds to subsidize the upfront expenditures. Like in Brazil, non-governmental organizations should offer farmers the opportunity to apply for assistance. These private organizations could partner with farmers to help develop strategies to encourage shade-grown coffee cultivation.[168]

[166] Ana Paula Tavares and Andre Freitas, "Are Sustainable Farming Certifications Making a Difference?," GreenBiz, last modified April 28, 2016, https://www.greenbiz.com/article/are-sustainable-farming-certifications-making- difference.
[167] Jha et al., "Shade Coffee," in *BioScience*, 426.
[168] Gobbi, "Is Biodiversity-Friendly," 278.

One example of an NGO that supports coffee farmers is TechnoServe. TechnoServe based in Washington, D.C., helps small-scale farmers increase their incomes and their living standards. The organization teaches farmers the correct techniques to produce coffee.[169]

NGOs and other private companies can also help coordinate roundtables to provide a space for dialogue between coffee farmers, government agencies, community leaders and NGOs. These roundtables can identify incentives for motivating coffee farmers to continue shade cultivation. NGOs, conservation groups and aid organizations can foster community cooperatives and local leadership, coordinate activities, educate farmers and provide technical and financial services.

6.6.6 Reward for Ecosystem Services

Ecosystem system services derived from BFC farms need to be captured by the market and should not ignored by policymakers. There are opportunities for farmers to sell carbon sequestration services. Despite carbon price volatility and constraints on market accessibility, revenues from carbon production can create additional revenue streams that incentivize smaller coffee operations.[170]

6.6.7 Building Relationships

Refining relationships between all players in the coffee supply chain can increase transparency and enhance the livelihoods of coffee farmers worldwide. For example, the sustainable coffee importer and roaster, Cafeology, seeks to forge long-term relationships with suppliers who share its strong ethical and environmental values. Cafeology buys its beans from Guaya'b, a BF certified cooperative in Guatemala. Cafeology has sought to understand the needs

[169] "Our Mission," TechnoServe: Business Solution to Poverty, http://www.technoserve.org.
[170] Jha et al., "Shade Coffee," in *BioScience*, 426.

of the farmers by visiting the farms from which it purchases, while also making financial donations to healthcare initiatives and local education.[171] The firm's strong relationship with the Guaya'b co-op creates traceability.

In addition, Freeman Trading, another importer, guarantees farmers a fixed price to protect them against volatility in the markets, while also forging a partnership based on fairness, trust and long-term alliance with the San Jorge Co-Op in Peru. Freeman Trading builds solid relationships that positively impact the farmers' lives. For instance, one project completed by Freeman Trading provided farmers access to electricity. This accomplishment allowed one farmer to purchase a computer so that his children could advance their educations. Furthermore, Freeman Trading is now working with Peruvian companies, NGOs and trade departments to expand on its long-term vision.[172] Creating lasting relationships between farmers, importers, roasters, NGOs, etc. benefits all actors involved in the supply chain.

6.6.8 Aid from Consumers Through Funds

In addition to government and private organization aid, consumers can also participate in financially assisting BF farmers. Consumers help pay for BF certifications through initiatives like "Adopt-A-Coffee Farmer Fund." Funds are responsibly allocated to famers that need assistance, which could acquire strong support from birders. Ultimately, consumers too can financially support BF farmers.[173]

[171] Katharine Earley, "Cafeology Cultivates Bird-Friendly Coffee," The Guardian, last modified April 30, 2015, https://www.theguardian.com/sustainable-business/2015/apr/30/cafeology-cultivates-bird-friendly-coffee.
[172] Freeman Trading, "Mission," Freeman Trading.
[173] Kammermeier, "Bird-Friendly Coffee," Laura Kammermeier: Writer, Biologist, Digital Strategist.

6.6.9 Conduct Necessary Research Prior to Certification

For farmers seeking BF certification, there are two elements for farmers to research and consider. First, farmers should receive quotes from different certifying agencies and inquire about requirements and schedules for the duration of the process. Farmers need to realize that third-party certifiers are offering a service, so farmers are technically certifiers' clients and should be treated as such. Second, producers need to ensure that their production for export justifies the cost to adopt the required agricultural practices. Although, there are many other factors small producers should consider before obtaining BF certification, researching the various certifiers and calculating costs are two critical steps.

6.6.10 Uniting Objectives: A "Super-Seal"

There has been some criticism of having three separate certification systems for coffee (organic, Fair Trade, and shade) suggesting a need for the integration of all three systems, a so-called triple certification. Since BF certification provides no guarantees regarding price for growers, it leaves them vulnerable to the volatility of coffee prices in the market. Although 90% of BF farms are Fair Trade certified, those wishing to be BF certified are not guaranteed to obtain Fair Trade certification.[174] For this reason, farmers could benefit from a "super seal" that unites the objectives of the three certifications. It may also be more cost efficient and serve as a simpler way to communicate sustainability in the marketplace.[175] However, a super seal will not exist anytime soon, since there is not even an official standard for shade-grown coffee. In summary, a triple seal would be easier for farms and not as cost probative.

[174] Shriver, "Bird Friendly," Daily Coffee News.
[175] Pojman, "Shade-Grown Coffee," Fresh Cup Magazine.

6.7 Conclusion

For certification to provide the desired effects for farmers and for biodiversity, the various issues with shade-grown and organic coffee must be tackled. After analysis of the advantages and disadvantages of organic and shade coffee, the financial viability of BFC cannot be verified. Financial viability of BFC farms can be improved through higher premiums, increased incentives for importers and roasters, diversification, incentives and discounts for farmers, rewards for ecosystem services, local and global involvement, aid from NGOs and other private companies, the construction of lasting relationships, support from consumers, farmers need to conduct research and uniting objectives. However, the lack of consistency in certification and the uncertain profitability of such expensive and extensive certifications make it difficult to increase farmer participation in such initiatives.

Chapter 7

The Marketing of Bird Friendly Coffee

"Coffee is turning out to be quite a cosmic issue– and the way it's grown, marketed, and consumed has implications for the environmental health of the world."

– Russell Greenburg, former director, Smithsonian Migratory Bird Center, 1996

The success of a coffee eco-label depends on verifying its claims of being biodiversity-friendly, and building a brand loyalty by communicating these claims to consumers. Marketing is Bird Friendly coffee's biggest challenge. The aim of this chapter is to identify the strengths, weakness, opportunities and threats faced by the American market for BFC. How can BFC flourish in emerging coffee markets?

7.1 Ethical Consumerism and Marketing "Green" Products

Across the globe, sustainable consumption is becoming a primary focus for many companies and consumers. The Brundtland Commission of the United Nations defined sustainable development as meeting "the needs of the present without compromising the ability of future generations to meet their own needs."[176] This definition highlights the importance of natural resources, such as air, water, soil, minerals and plants, to humanity's survival. In light of the increasing awareness of the magnitude of environmental issues, consumers are starting to

[176] Daviron and Ponte, *The Coffee*, 164.

prefer environmentally friendly products or services intended to mitigate negative environmental effects.[177]

The modern "going green" movement began a few years after industrialization matured and people became increasingly concerned with the threatening pollution levels and limited resources. In 1963, Rachael Carson's book on pesticide poisoning, *Silent Spring*, further influenced people's perceptions on humanities negative interactions with the environment. With the growth of media, people's awareness of the various environmental catastrophes that occurred in the 1980s grew, such as toxic-waste dumps, a nuclear meltdown, and a large oil spill. Consumers questioned governmental and corporate accountability. These calamites began a wave of boycotts on goods sold by companies known to pollute and goods that were not in environmentally friendly packaging. Throughout the 1970s and 1980s, the U.S, market saw a clear change: the increasing growth in the demand for natural foods.[178] By the mid-1980s, people associated natural foods with high, healthy quality. In 1990, *Time* Magazine named Earth "Planet of the Year" after over ten million people participated in the twentieth annual celebration of Earth Day. Today, consumers needs for green products have only grown since then and continue to be a top priority.

Because of the rise in environmentally conscious consumers, companies have adopted green marketing strategies. Green marketing is the development and marketing of products designed to minimize negative effects on the physical environment or to improve the environment.[179] This marketing concept relates to companies' willingness and acceptance of their accountability regarding the environment. Green marketing includes a variety of activities,

[177] Woo Gon Kim, Yoon Jung Jang, and Hae Young Lee, "Coffee Shop Consumers' Emotional Attachment and Loyalty to Green Stores: The Moderating Role of Green Consciousness," *International Journal of Hospitality Management* 44 (January 2015): 150.
[178] Dicum and Luttinger, *The Coffee*, 150.
[179] Ibid., 151.

such as packaging changes, modifying advertising, production modification, and changes to the production process.[180] Although revenues and profits are the core concern of a company, green marketing is crucial for companies to gain a competitive advantage and increase brand equity and customer loyalty. In 2005, The Natural Marketing Institute found that "nine out of ten Americans say that it important for companies to look beyond pure profitability and to be mindful of their impact on the environment and society."[181] Although some companies were initially skeptical about adopting environmental responsibility initiatives, they have realized that considering consumer preferences has positively affected their profits. Green products tend to be priced higher than regular brands. However, since green products are perceived to be of higher quality, consumers are willing to pay a premium price. Yet, most green consumers are people with more disposable income.

Green consumers are defined as consumers who are concerned about environmentally responsible purchasing patterns and understand how their consumption habits affect the environment around them. Green purchase behaviors include buying eco-friendly products, energy-efficient cars and home insulation equipment. Four out of ten Americans (93 million people) claim they are committed to purchasing green services and products. Studies show that young adults, (ages 18 to 34) and Hispanics drive green purchases.[182] Whereas, those born before the 1950s are the least green age group. Children and teens are the most knowledgeable about green products and tend to influence their parents' purchasing decisions.

Studies have found that consumers choose a green product based on its green features and their environmental awareness of the product. Product features influence consumer-perceived

[180] Norazah Mohd Suki, Norbayah Mohd Suki, and Nur Shahirah Azman, "Impacts of Corporate Social Responsibility on the Links Between Green Marketing Awareness and Consumer Purchase Intentions," *Procedia Economics and Finance*37 (2016): 263, ScienceDirect.
[181] Dicum and Luttinger, *The Coffee*, 187.
[182] Ibid.

value. Product attributes, such as eco-labeling, packaging and branding are value indicators for consumers. Eco-labels, a market-based conservation instrument, are gaining popularity within the market.[183] As mentioned before, eco-labels are important indicators for consumers and enable consumers to differentiate among commodities based on their environmental attributes (refer to Table 2).[184] Certification has become an almost indispensable marketing tool for many agricultural products; however, as coffee moves through the value chain it loses its traceability. Consequently, there is much less consumer awareness concerning the production process. The key issue is that if producers embed symbolic content into their product, consumers need to know what the symbol means, value it, and pay for it.

Figure 10: Birds & Beans coffee varieties with on-pack labels[185]

[183] Edward S. T and Wang Jai-Rong Yu, "Effect of Product Attribute Beliefs of Ready-to-Drink Coffee Beverages on Consumer-Preceived Value and Repurchase Intention," *British Food Journal* 118, no. 12 (2016).
[184] Van Loo et al., "Sustainability Labels," 417.
[185] Robin D. Schatz, "Cause Marketing 101: How A Massachusetts Coffee Company Educates Consumers To Help Save The Birds," Forbes, last modified February 28, 2016, https://www.forbes.com/sites/robindschatz/

7.2 Sustainable Coffee in the Marketplace

The idea of "sustainable coffee" grew from the organic and Fair Trade certifications, especially after the inclusion of various scientific research that quantified the benefits of shade-grown coffee for biodiversity. The link between sustainability and coffee enables the promotion of criteria that encourages coffee consumption for its peripheral benefits. As discussed previously, beginning in the 1990s, several sustainability programs were created and remain in existence that determine what constitutes sustainability in terms of coffee production and in terms of trade (refer to Table 2). In early 1995, "a number of people from organizations representing NGOs and the private sector began meeting in the hopes for forming what they called the Coalition for Sustainable Coffee."[186] The Coalition intended to consolidate the initiatives and certification process for Fair Trade, organic, and biodiversity-friendly under one initiative. Unfortunately, these efforts were never funded and proposing criteria for sustainable coffee was left to private organizations. However, coffee companies quickly adopted the term "shade-grown" as a marketing buzzword despite the failure of the group's formation. The inclusion of shade on coffee packaging spurred an entirely new marketing approach, which changed how coffee production was viewed and valued.[187]

The three primary sustainable coffees–organic, Fair Trade, and shade-grown – all aim to provide benefits for coffee-growing areas by exploiting consumer choice. Because there exists an overlap between the three–many organic coffees are also shade-grown and many Fair Trade coffee are both shade-grown and organic – means that the growth of each furthers the objectives of the others. Sustainable coffee, now a vibrant sector, spells hope for Bird Friendly coffee.

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[186] Robert A. Rice, "In the Pursuit of Sustainability: Lessons from the Coffee Sector," *International Journal of Environmental Protection and Policy* 3, no. 1 (January 2015): 14, Science Publishing Group.
[187] Gustave Axelson, "Making Sense Of Coffee Labels: Does Your Coffee Support Wintering Warblers?," Cornell Lab of Ornithology, last modified October 9, 2012, https://www.allaboutbirds.org/making-sense-of-coffee-labels-shade-grown-organic-fair-trade-bird-friendl/.

7.3 The Global Market for Bird Friendly Coffee

In the United States, the market for specialty coffee, which includes organic and shade grown varieties, has grown rapidly during the past decade. In 2012, specialty coffees accounted for 37% of U.S. coffee sales by volume and nearly half by economic value, an estimated $30 billion to $32 billion.[188]

The segment of consumers committed to the organic lifestyle is increasing. Organic living encouraged organic coffee consumption, which was reflected in the Organic Trade Association's (OTA) 2011 Organic Industry Survey. The marked growth of organic coffee sales, which jumped 17.5% from 2010 to 2011, coincided with the increase in the sale of BFC, as real revenues grew from $1.5 million to $4 million from 2005 to 2010.[189] In addition to revenue generation increases, the production and sale of BFC realized 25% annual growth over the period of 2007-2010.[190] Given the growth of revenues and volume consumed, the consumer preference for organic and shade-grown coffee remains relevant.

The BF program has been around for over a decade, and its growth has been disappointing in totality.[191] In an interview with Mehari Berhanu, the representative for the Ethiopian BFC cooperative Torban Anfilo Multi Purpose Farmers Cooperative Union, he exclaimed that there is no market interest for BFC.[192] Although BFC comprises less than 1% of the global coffee market, the room for growth exists, since less than 10% of the more than twelve million pounds of coffee meeting BF certification standards bears its label.[193] BFC provides safe havens for migratory birds, just as it creates a mostly untapped link between the millions of

[188] Jha et al., "Shade Coffee," in *BioScience*, 421.
[189] "Organic Market Analysis," Organic Trade Association, https://www.ota.com/resources/market-analysis.
[190] Rice, "The Global," Smithsonian's National Zoo & Conservation Biology Institute.
[191] Shriver, "Bird Friendly," Daily Coffee News.
[192] Mehari Berhanu, e-mail interview by the author, March 13, 2017.
[193] Axelson, "Bird Friendly," Cornell Lab of Ornithology.

coffee-drinkers and the millions of bird-lovers who value sound environmental practices like sustainability.

7.4 Where is Bird Friendly Coffee Sold?

Currently, Bird Friendly certified coffee's availability in stores and in coffee shops remains limited. Most BF roasters and retailers sell online. However, BF coffee's availability has increased with the decision by Whole Foods Market to sell BF in its more than 350 stores in the United States and in Canada beginning in 2013.[194] Whole Foods sells "The Early Bird Blend" and "Organic Selva Negra," which their wholly-owned subsidiary Allegro Coffee provides. Other retail stores offering BF coffee include Wild Birds Unlimited, Fred Meyer (a supermarket chain of over 130 stores in the Pacific Northwest), and some H.E.B. locations. In addition, cafes, bed and breakfasts, restaurants, Audubon societies and convenience stores also offer BFC. Today, 35 roasters in the U.S., Canada and Japan carry BFC. A full list of stores and online retailers can be found on the SMBC's website.[195]

Even though BFC is expanding into more and more physical locations, distribution makes it difficult for small companies to place their product in well-known name brand stores. Small companies must start with local and regional retailers and move towards national retailers with growth.

As the SMBC pushes for stronger presence of BFC in stores, consumers' recognition of BFC will increase, thereby encouraging sales and availability. However, the fact remains that BF certified coffee remains difficult to find on store shelves and at cafes because of its limited

[194] Ibid.
[195] Smithsonian, "Bird Friendly Coffee Roasters," Smithsonian's National Zoo & Conservation Biology Institute, https://nationalzoo.si.edu/migratory-birds/bird-friendly-coffee-search.

production, small number of importers and retailers and the frequency with which BF-certifiable coffee fails to hit the market with the appropriate label.

7.5 Why is Bird Friendly Coffee Struggling in the Marketplace?

7.5.1 Limited Number of Farms

One reason Bird Friendly coffee remains difficult to locate is the ridiculous certification process that few coffee producers can complete. Likewise, as discussed previously, BF certification is cost-prohibitive for most producers. As of 2014, the BFC market experienced a dramatic decrease in the number of certified hectares and metric tons produced. For instance, in 2012, producers managed approximately 8650 hectares of BFC and produced around 4735 tons of BFC. However, in 2014 only 5544 hectares were certified and 3524 metric tons produced (less than the 3600 tons produced in 2006).[196] The significant drop in certified hectares highlights the stringent criteria hindering farmers, as farmers continue abandoning shade-grown production for more lucrative land-use practices. "The paradox is that there is greater public interest than ever in environmentally friendly coffee, but where coffee production is expanding across the globe, it tends to be very intensive,"[197] says Shalene Jha, assistant professor in The University of Texas at Austin's College of Natural Sciences.

In a phone conversation with Lola Savannah, a former BF roaster, they acknowledged that purchases from her company's BF coffee supplier ceased when the farm sought to transition

[196] Julie Craves, "Eco-Certified Coffee: How Much is There?," Coffee & Conservation, last modified February 2017, http://www.coffeehabitat.com/2011/05/market-shares-2010/.
[197] The University of Texas at Austin, "Shade Grown Coffee Shrinking as a Proportion of Global Coffee Production," *UT News: The University of Texas at Austin*, last modified April 16, 2014, https://news.utexas.edu/2014/04/16/global-production-of-shade-grown-coffee-shrinking.

the land into farmland.[198] Not only are there a limited number of BF producers, but there are also a minimal number of importers and retailers.

7.5.2 A Limited Number of Buyers and Retailers

One of the main drivers for farmers to obtain certification is access to buyers. However, Bird Friendly producers struggle to sell their coffee beans, because many importers and roasters refrain from purchasing these beans. Unlike, Rainforest Alliance, the BF program requires licensing fees from importers and roaster, which significantly hinders attracting buyers. As discussed before, BF producers will only realize premiums if they find a certified importer willing to purchase the beans. Importers and retailers are not buying a lot of BFC because there is limited demand from downstream market actors. According to Jason Burton, a marketing director and brand manager in the specialty food and beverage industry, while most consumers have never heard of BFC, most roasters are aware of its existence but are still not purchasing it.[199]

Similarly, Atlantic Specialty Coffee acknowledged that even though the company offers BFC, roasters almost never ask for it by name. In addition, Lola Savannah, a former BF roaster, explained that BFC availability ended because the product was "nearly unprofitable".[200] With the average price per pound between $8-10, BFC was simply too expensive for customer demand. Savannah noted that the importer and roaster fees are paid together, which make BFC cost-prohibitive. Lola Savannah remains on the SMBC's roaster list, which frustrates her since she has repeatedly asked for removal from the list.[201] Thus, the SMBC's list of possible BFC sources remains inaccurate and inflated in number. In 2010, there were 46 roasters in the U.S., Canada,

[198] Lola Savannah, telephone interview by the author, March 3, 2017.
[199] Jason Burton, e-mail interview by the author, February 15, 2017.
[200] Tina Berard, e-mail interview by the author, February 14, 2017.
[201] Savannah, telephone interview by the author.

The Netherlands and Japan imported by sixteen companies. However, as of 2017, there are only 34 roasters in the U.S., Canada and Japan imported by twenty companies.[202] Despite the decline in roasters, some producers may not have a hard time finding buyers, if they have already established a strong relationship with an importer.

In addition, in a conversation with Dariush Echeverria of the Guatemalan BF farm, Finca Ceylan y Anexos, he said that even though BF is the only real certification of shade grown coffee, the people involved in the supply chain do not value the real purpose of the certification.[203]

Finally, Jason Burton of The LAB also highlighted that selling shade-grown coffee is not important for coffee shops, as he admitted, "You might run across one or two in the U.S., but I've never seen that as a focus."[204] Unfortunately, shade-grown has not made a significant stronghold in the market yet, making it even harder for BF to achieve its desired performance.

7.5.3 Disruption in the Supply Chain

Another reason why BF coffee lacks a stronghold in the marketplace is because much of the coffee meeting BF requirements lacks such labeling within the market. Robert Rice, a research scientist at the SMBC, noted, "Probably about only 10 percent of coffee from Bird Friendly certified farms carries the Bird Friendly stamp on the package."[205] For instance, in 2014 of 3524 tons of BFC produced, only around 325 tons were sold as BF (9% of production).[206]

Given the high cost of meeting BF certification requirements and the lengthy duration of the process, many producers sell their coffee beans locally to avoid the supply chain

[202] Smithsonian, "Bird Friendly," Smithsonian's National Zoo & Conservation Biology Institute.
[203] Dariush Echeverria, e-mail interview by the author, March 11, 2017.
[204] Burton, e-mail interview by the author.
[205] Axelson, "Making Sense," Cornell Lab of Ornithology.
[206] Craves, "Eco-Certified Coffee," Coffee & Conservation.

requirements of the certification process. Selling the coffee "at the farm gate" makes for a swifter sale that avoids more extensive production requirements. However, once the farmer receives payment for the coffee by an uncertified buyer, the coffee cannot be sold as certified BF.[207]

As coffee moves through the commodity chain, importers can disrupt coffee's traceability. For instance, Tina Berard of Atlantic Specialty Coffee admitted that because most roasters do not ask for BF by name, the company sells certified BFC as either organic or shade-grown. She explained that in the earlier days of organic certification, Atlantic Specialty Coffee would purchase BFC because "the certification encompassed a shade-grown element which is what coffee roasters were most interested."[208] The firm's website reveals that although it purchases BF coffee, there is no indication of BF certification on the products. Also, Robert Rice explained that since BFC is certified organic, it is often sold as organic only. Again, many importers and roasters do not value the BF initiative.

Lastly, even though many products qualifying for BF certification fail to receive the appropriate labeling, these products are often still delineated in business-to-business transactions.[209] While purchased as BF from farmers, the products often lack the label when placed into coffee retailers. Thus, when companies like Starbucks and Whole Foods purchase BF coffee, they often refrain from altering their packaging to include the BF certification logo, since doing so would only appease the small group of birders and would require extensive costs.[210] Ultimately, the decisions made by the actors in the supply chain impact the amount of BFC that makes it to the market.

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[207] Ibid.
[208] Berard, e-mail interview by the author.
[209] Axelson, "Making Sense," Cornell Lab of Ornithology.
[210] Ibid.

This challenge could be remedied through supply chain auditing, which would limit risks to suppliers by enhancing their techniques and simultaneously signaling the value of sustainability.

7.5.4 Consumer Confusion and Lack of Awareness

Although the market for specialty coffee has grown rapidly in the U.S. during the past decade, Bird Friendly coffee is plagued by consumer confusion, contention and slow acceptance. Few people are familiar with what BFC is and what constitutes the label. When attempting to explain how BFC involves more than just the coffee itself, people question the link to biodiversity. The hesitation regarding BFC is not unreasonable, nor are doubts about its implications for the environment. Despite that more than 2.25 billion cups of coffee are consumed around the world each day, most drinkers do not associate coffee with forests and biodiversity.[211]

Most consumers would not understand the message the BF logo attempts to communicate. Fortunately, after more than ten years, the SMBC debuted its new Bird Friendly seal on April 11, 2017. The SMBC changed the logo to focus more on habitat, including dense forestry of differing heights and the presence of birds, which improves its reception. Moreover, instead of just bearing the "Bird Friendly" label, now these products relay the "Bird Friendly Habitat" message, which reveals more about the benefits of Bird Friendly production. Finally, the inclusion of the Smithsonian name and sun symbol adds credibility to the logo, while simultaneously sparking interest in the label's meaning. Ultimately, the new logo will aid in rebranding and clearly communicate the benefits of BFC to consumers.

[211] Potts et al., "The State," The International Institute for Sustainable Development.

Figure 11: The new Bird Friendly logo

Figure 12: The old Bird Friendly logo

Despite the logo redesign, there still remains a lack of awareness for shade-grown coffee, especially BFC. Most consumers do not know it exists let alone what it means. In fact, most producers, roasters and importers blame the SMBC for BFC's marketing struggles. For example, Atlantic Specialty Coffee company claimed, "As a certification, the organization [SMBC] does little to no marketing. I believe this is the reason why the label is fairly unrecognizable to the

general public."[212] Furthermore, only 15% of American coffee drinkers are aware of shade-grown coffee.[213]

The uniqueness of shade-grown coffee cannot be adequately explained to a coffee consumer who knows little about traditional production techniques. Thus, the higher-priced BFC proves a hard sale for people who are unfamiliar with the process and its benefits. Although consumers are largely unfamiliar with BFC, the growth of other certifications encourages their continued use. As consumers familiarize themselves with certifications, market accessibility and, subsequently, market share grows. Increasing consumer awareness enables higher market penetration, which encourages BFC production and biodiversity efforts. Despite the growth of the Rainforest Alliance's branding, BFC demand remains thin and stagnant given low consumer awareness.

7.5.5 Consumer Preferences: Quality Over Certification

For the majority of consumers, the intrinsic quality of a product is of more importance than is certification. Consumers look first for quality, not certifications.[214] Fernando Lima, owner of the Grupo Balcanes BFC farm, remarked that customers value the quality of coffee before certifications, but BF and organic certified coffees are growing.[215] Consumers must understand that BFC is high quality, because the beans mature slower, the soil regenerates and there no pesticides are used. Many roasters agree that that a shade-grown coffee ranks as a superior tasting product. Thus, many consumers, given increased awareness of shade production techniques, would prefer a certified organic product that lacks the inclusion of pesticides. Nonetheless, many argue that "there are a host of coffee consumers who would rather drink

[212] Berard, e-mail interview by the author.
[213] Dicum and Luttinger, *The Coffee*, 191.
[214] "What Are We Drinking?," The First Pull: National Coffee Association USA.
[215] Lima, interview.

a very good certified organic coffee than opt for an excellent "relationship" coffee that is plied with high levels of petroleum-based fertilizers and sprayed with toxic cocktails of pesticides."[216]

7.5.6 The Smithsonian Migratory Bird Center's Marketing Woes

As a certification run by a scientific research center, the SMBC's Bird Friendly certification program struggles because of poor marketing efforts and a general consumer ignorance to Bird Friendly production processes and benefits. The SMBC fails to adequately market not just the coffee, but also the branding. Branding propels eco-labeling, and the SMBC has not taken the necessary steps to create awareness or general recognition of its certification. Consumers spend time researching a high involvement purchase such as a computer, but less likely to invest in finding out about every day, low involvement purchases like coffee. The brand should do the work, so that the consumers do not have to. First, the SMBC website is difficult to navigate and provides limited information on the certification itself. Additionally, the SMBC infrequently maintains its blog, lacks a Facebook page, Instagram or Twitter specifically for BFC. The SMBC possesses a Twitter account, but only occasionally posts about BFC. Rather than visiting the SMBC's website, consumers who want to learn more about BFC are better off heading to Coffeehabitat.com when seeking a broader, more informative source on shade-grown and organic coffee. Julie Craves, the website's author and a University of Michigan ecologist, provides information, honest criticisms and recommendations regarding shade-grown coffee. Furthermore, the SMBC could make some major improvements to its social media presence.

The producers, importers and roasters I have talked with agree that the SMBC does little to no marketing. Given the research emphasis of the SMBC, most of its funds are most likely

[216] Coffee Talk Media, "Organic Certification — Not Only Relevant Today, But Vital," Coffee Talk Magazine, last modified March 19, 2012, http://coffeetalk.com/ctmagazine/03-2012/2623/.

allocated to science, not marketing. Jason Lab described the SMBC's marketing position perfectly:

> *It needs to be less stiff and soft spoken, in my opinion. If you don't get in people's faces with info and content in an engaging way in most fascinating industries the message will never break through. When I worked with bird-friendly the client was great, but was extremely fragile in their marketing. Their audience was one that was already coming to them due to environmental concerns over coffee, but there was never a real splash or push. I consider myself to be a pretty aware consumer in life, but at the end of the day with two kids, a wife, a business, and a super busy schedule if you don't get my attention I'm usually moving on.*[217]

In addition, in a conversation with Dariush Echeverria of the BF farm, Finca Ceylan y Anexos, he explained that the SMBC gave the exclusivity of control of certification eco-label sales in Japan to Sumitomo Corporation. In 2004, the SMBC implemented the BFC program because of the attractive Japanese market and the corporation's expertise in trading and marketing. Sumitomo Corporation imports the coffee, and supplies only three roasters.[218] Therefore, the seal barrier limits who can sell BFC, and thus restricts roasters not affiliated with Sumitomo from using the seal. Mr. Echeverria remarked that, "Sumitomo is the company that controls the sales of BF coffee, so until the Smithsonian makes more propaganda on the importance of this certification, the seal is not going to grow more"[219] and will not it protect the people who make the certification important.

Lastly, the SMBC urges consumers to increase availability of BFC through giving this printable flyer to store managers. This is arguably one of the SMBC's only ways they attempt to create demand and it involves no effort on the side of the SMBC. The flyer is poorly made and looks unofficial.[220] Beyond its design, the flyer does not possess an adequate hook necessary to

[217] Burton, e-mail interview by the author.
[218] Sumitomo Corporation, "Bird Friendly® Coffee," Sumitomo Corporation, last modified March 2017, http://www.sumitomocorp.co.jp/english/business/article/id=245.
[219] Echeverria, e-mail interview by the author.
[220] Kammermeier, "Bird-Friendly Coffee," Laura Kammermeier: Writer, Biologist, Digital Strategist.

persuade store managers to research BFC. Overall, it is clear the SMBC desperately needs to ramp up its marketing efforts in order to make BFC a success.

Bird Friendly® Coffee
It's certified organic and certified shade.

Store Manager:

Please find a roaster/supplier who can provide you with fresh-roasted, certified organic, "BIRD FRIENDLY®" coffee. Ask your coffee suppliers to look for the "Bird Friendly®" certification mark.

A source list is available on www.si.edu/smbc at the "Coffee" page.
Thank you! A concerned and loyal customer, _____
(Name)

Figure 13: Store manager request flyer[221]

7.5.7 Consumer Demand and Willingness to Pay

Expanding the market for sustainable coffee depends on the adoption of economic and environmental goals by coffee producers and consumers' willingness to pay premium prices for a product encouraging biodiversity. Consumer demand is reflected in the willingness pay higher prices for products certified as sustainable.[222] Unfortunately, a majority of consumers are unwilling to pay a premium for shade coffee, let alone BFC.

Thus, consumers need to create demand for BFC in order to being to reverse the ecological damage done to tropical forests. If major coffee purchasers, like Starbucks and Dunkin' Donuts, use BFC, then customers associate a sense of purpose with the more expensive

[221] "Store Manager Request for Bird Friendly Coffee," Smithsonian's National Zoo & Conservation Biology Institute, https://nationalzoo.si.edu/scbi/migratorybirds/coffee/StoreManagerRequest.pdf.
[222] Fleischer, "Toward More," Rural Development Department: The World Bank.

coffee and might subsequently demand BFC in the future. A connection between BFC and its ecological impacts must be created to spur BFC demand. If major coffee retailers and consumers forge a shared purpose in shade-grown coffee, then more can be done to reverse the effects on forests where current coffee production occurs.[223]

Despite a general ignorance regarding BFC and limited demand, the potential for growth exists. Only a few years ago, you could not find organic products on store shelves, but now consumer preferences are changing and demand has increased significantly. And trends show no sign of slowing. Maybe BFC will have the same fate.

7.6 Problems Arise Between Two Vastly Different Shade Certifications

7.6.1 Rainforest Alliance vs. Bird Friendly

Having two different shade initiatives – Rainforest Alliance and the Smithsonian Migratory Bird Center's Bird Friendly – in the market, with very different standards contributes to the confusion in ways that adversely impact both efforts. Over the past decade, the Rainforest Alliance has gradually revised its criteria (the Sustainable Agricultural Network standards) used for the Rainforest Alliance certification. The latest revision to the SAN standard (2017) has been approved and will be used for audits beginning in July 2017.

The newest standard (2017) addresses a plethora of issues, including environmental and social components. After years of revision, the standard has improved on specific criteria and the main purpose of the protocols, which are far more in-depth than necessary for this discussion. Thus, focus here is on the shade component, because the new shade requirements make the RA certification no longer truly a "shade" initiative.

[223] Julie Craves, "The New Rainforest Alliance Shade Requirements," Coffee & Conservation, last modified February 2, 2017, http://www.coffeehabitat.com/2017/02/new-rainforest-alliance-shade-requirements/.

7.6.2 A Comparison of SAN Shade Standards Over the Years

The Sustainable Agricultural Network (SAN) criteria regarding shade for coffee farms has slowly changed in the past decade. To show the drastic changes between revisions, below are the shade criteria from the 2005 SAN standard. At the time, these standards were mandatory for initial certification.

> Farms located in areas where the original natural vegetative cover is forest must establish and maintain, as part of the conservation program, permanent shade distributed homogenously throughout the plantations; the shade must meet the following requirements:
>
> a. A minimum of 70 individual trees per hectare that must include at least 12 native species per hectare.
>
> b. A shade density of at least 40% at all times.
>
> c. The tree crowns must comprise at least two strata or stories.
>
> A farm without shade can be certified once it has a shade establishment or expansion plan and shade established in at least 25% of the production area. Shade must be established in the remaining 75% of the production area within five years. Farms in areas where the original natural vegetation is not forest must dedicate at least 30% of the farm area for conservation or recovery of the area's typical ecosystems. These farms can be certified once they have a plan to establishment or recover natural vegetation within ten years. Vegetation must be re-established or recovered in an equivalent of 10% of the total farm area (one-third of the 30%) during the first three years of the plan.[224]

The new standard (2017) provides a lengthy list of criteria, which are divided into four tiers, with critical criteria required and Levels A (best), B (better) and C (good) representing sustainability adherence. To achieve certification standards, farms must meet all critical criteria completely, in addition to meeting at least half of the Level C criteria. Once certified, farms are required to meet higher thresholds for criteria completion. For example, farms entering the sixth

[224] Julie Craves, "The (De)evolution of Rainforest Alliance Shade Criteria," Coffee & Conservation, last modified March 7, 2014, http://www.coffeehabitat.com/2014/03/ra-shade-criteria-change/.

certification year "must meet all critical criteria, plus 90% of Level C criteria, 90% of Level B criteria, and 50% of Level A criteria."[225]

The 2017 revision contains no mandatory shade cover criteria required for initial certification. Coffee farms must currently have 40% minimum canopy cover and a minimum 12 native tree species per hectare.[226] Also, the measurement of canopy cover occurs during the densest foliage levels given changes in coverage across different seasons. However, the new criteria allow farmers to either meet the two criteria above or have at least 15% total native vegetation coverage across the farm.

[225] "Sustainable Agriculture Standard," Sustainable Agriculture Network, http://sanstandard2017.ag.
[226] Ibid.

Criteria	SMBC	RA
No. tree species	>10	>12/ha
No. trees/ha (mean)	na	na
% allowed to be Inga trees	<60	na
% shade cover	>40	>40
No. of shade layers	3	na
% leaf volume in each shade layer	No min, but required	na
… >15m (emergent)	>20	na
… 12 to 15m (backbone)	>60	na
… <12m understory	>20	na
Epiphytes required?	Yes	na

Table 4: Criteria comparison[227]

7.6.3 What Does This Mean for the Environment?

In summary, the newest requirements from the Rainforest Alliance have reduced the shade requirements and are less strict in terms of criteria and adherence. Ecologically speaking, how will this impact the habitat?

There are no strata requirements. As discussed previously, the more strata, the greater the biodiversity. The requirements also fail to detail how the vegetation must exist, as the vegetation must simply cover a percentage, as opposed to being specifically located where coffee is

[227] Julie Craves, "Quick Look at Differing Shade Criteria," Coffee & Conservation, last modified 2017, http://www.coffeehabitat.com/2007/07/quick-look-at-d/.

produced or in a continuous format. Small and fragmented plots lack the same benefits as a shade agroforestry system, which demands canopy cover of a certain type, density and spread.

Moreover, even though the 40% minimum canopy cover and 12 native tree species is mentioned in the standard, the RA states that farms can meet criteria through those standards *OR* by possessing the 15% native vegetation cover instead. Possessing vegetation cover is far different than retaining quality canopy cover that encourages habitation, as less stringent policies on the density of the shade and of the canopy inhibit bird and plant species cultivation.[228]

Given the lack of stringent requirements, the Rainforest Alliance certification represents a poor metric for actual sustainable achievement. For example, farms that earn certification must only show some increase in conditions, meaning that a farm can obtain certification and still fail to meet the 15% vegetation cover threshold so long as it reveals plans to continue advancing toward this number. Given the low requirements, both shade monoculture and sun coffee productions are eligible for Rainforest Alliance certification, which nullifies its true focus on shade cultivation.

The new RA standard directly contrasts the BF standards, which require criteria completion in all areas, including shade canopy density, strata and organic certification. On BF farms, trees must retain 80% coverage after pruning.[229]

The questionable nature of the new RA standards does not intend to claim that all RA-certified farms possess the bare minimum in terms of shade density or vegetation cover. In fact, many of the farms exceed these thresholds and are required to maintain them as a contingency of their certifications. However, consumers are not able to differentiate between farms that meet and exceed higher thresholds and possess significant shade covers and those that are barely

[228] Craves, "The New Rainforest," Coffee & Conservation.
[229] Ibid.

meeting the minimum requirements and using the 15% vegetation cover to meet the basic criteria.

7.6.4 Consequences of the New Criteria

The RA's new standards blurs the lines of transparency that are far greater for BF certification. For consumers who desire shade-grown coffee or coffee that thrives in environments of peak biodiversity, the RA standards limit the adequate selection of such products. Although the Rainforest Alliance claims to seek the conservation of biodiversity as its primary mission, its newest standard might not only lessen the value of its own certification program, but also minimize the value of other coffee certification programs in the process. Consumers value such certifications and trust that the processes are accurate and honest, so deceptive practices and easier attainment places such programs in doubt.[230]

Prior to the lowering of the RA requirement, shade coffee met high thresholds and was more comparable within the market. However, by allowing more farms to claim shade coffee status, the products are differentiable and the quality changes. The lower light levels created by sparse canopy cover can change how fast the cherry ripens, and thus its taste. Because taste "is probably the ultimate catalyst for a coffee purchase, diluting the "shade coffee" market with potentially lower quality beans not actually grown under shade may potentially lower market demand for shade coffee."[231]

Although the RA's newest standard forces farms to commit to increasing their standards annually to retain certification status, lower entry barriers allow for improvement to occur from extremely low levels. Farmers who have achieved this status when the standards were higher face diminished incentives to retain it, since their products enter the market with the same

[230] Rice, "The Global," Smithsonian's National Zoo & Conservation Biology Institute.
[231] Craves, "The New Rainforest," Coffee & Conservation.

branding as those from farms with minimal shade cover and low vegetation density. This creates the same issues that BFC faces, as the incentives do little to entice participation. The farmers who are most incentivized by these new standards are those who could have never met the threshold requirements before their reduction, which allows for market exploitation.

Aside from market conditions and price impacts, the reduction in the RA's certification requirements represents a degradation to science-based shade and biodiversity criteria. If such low standards become the norm, farmers will be less inclined to create the more expensive and extensive canopy covers that have been scientifically proven to foster the highest levels of biodiversity.[232]

Overall, the Rainforest Alliance has made tremendous contributions to the economic and environmental sustainability of many producers and agricultural products. Sadly however, due to the lack of transparency and because the changes in the RA's shade criteria will impact biodiversity negatively, I suggest that consumers looking for shade-grown coffee should not purchase RA certified coffee.

7.6.5 Solutions for "Shade-Grown" Coffee: Mending the Lack of Transparency

Within in the sustainable coffee sector, shade-grown coffee is susceptible to fraud, damaging it reputation and validity. Given the lack of continuity regarding industry definitions for labels like "shade-grown" and no industrywide standards for what shade-grown coffee requires, the potential for unclear requirements exists. Unlike the International Federation of Organic Agriculture Movements (IFOAM) or Fair Trade Labeling Organizations International (FLO), shade does not have a world organization to create common and well-defined practices

[232] Ibid.

for certifying shade systems. Having two different shade certifications that vary greatly creates confusion amongst consumers.

In addition, there are many "shade" coffees on the market; however, the claims are made by marketers selling the coffee. Marketers use buzz words such as, "shade" and images of birds to send a message to consumers, without any significant environmental commitment. These greenwashing claims are made by many coffee producers and roasters who self-assess the habitat quality of the farms, but there are no easily verifiable ways to determine the validity of their claims. Consumers are given a false sense of what is being done with their money and cannot make informed decisions that an efficient market requires.[233]

Credibility in the marketplace is critical for the success of products that make environmental and social claims. Claims of sustainable production can be best supported by assessments from independent third-parties. Even with that said, when "shade-grown" or Rainforest Alliance certified coffee reach the marketplace, the consumer does not know what level of shade is present on the farm. That means the shade-grown coffee could be a bit "shady" in practice such as, coffee grown among sparse trees that are fed pesticides and fertilizers.

Likewise, there is the question of product purity. It is important to question: Have the certified coffee beans been diluted by mixing with beans that do not meet sustainability standards?[234] RA allows use of the seal on coffee that contains only 30% certified beans. While RA will disclose the amount certified on the package, apparently when RA claims 100% of the beans are certified, but it could actually mean that only 81% are certified. This is because "players at both ends of the coffee supply chain are allowed to mix in up to 10% non-certified

[233] Pojman, "Shade-Grown Coffee," Fresh Cup Magazine.
[234] Rice, "In the Pursuit," 18.

beans without penalty."[235] This so-called "sustainable" certification permits dilution. As a result, consumers do not know exactly what they are getting with "shade-grown" or RA because their beans may be mixed with lower quality beans, sun-grown beans.[236] Many roasters think that "the "30% rule" tarnishes a great certification, confuses or misleads consumers, and indicates too much concession to corporate interests."[237]

In contrast, to carry the Bird Friendly seal, 100% of the beans must be BF certified. This guarantees transparency, which is essential for consumer confidence. Robert Rice of the SMBC commented on the problem of product purity:

> *Our feeling is that if a certification mark is going to represent whatever it is that it states it represents, then strict standards and enforcement need to in place. In discussing this issue with many people, I've found that those who are concerned about environmental and/or social issues and look for such seals expect nothing short of 100% purity. We would all do well to work toward that high-water mark. By holding everyone along the commodity chain to the highest standards possible can we create reliable, credible coffee products that we can truly say link conservation to the market place.*[238]

Thus, there is a need for official shade standard for certifications in order to dispel the lack of transparency and confusion.

Furthermore, critics argue that the "shade" label should be redefined as "biodiversity-friendly" to entice purchase and increase awareness of the additional benefits shade-grown coffee provides. It is important to note that birds are a highly visible marker species, they are known as one of the more obvious indicators of biological diversity. No matter the name, an official standard will increase demand for not only shade-grown coffee, but also BFC. This united front would champion the definition of shade in the marketplace. The role of science in

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[235] Julie Craves, "When is 100% not 100%?," Coffee & Conservation, last modified June 20, 2009, http://www.coffeehabitat.com/2009/06/when-is-100-not-100/.
[236] Rice, "The Global," Smithsonian's National Zoo & Conservation Biology Institute.
[237] Craves, "When is 100%," Coffee & Conservation.
[238] Julie Craves, "More on the Purity of Certified Coffees," Coffee & Conservation, last modified July 14, 2009, http://www.coffeehabitat.com/2009/07/more-on-the-purity-of-certified-coffees/.

establishing a set of criteria for the shade standard is paramount. For the shade standard to claim sustainability, the criteria need to be based on science.[239] Although I will not recommend specific standards the official shade body should include, the standards should be much stricter than Rainforest Alliance's criteria, but possibly not as strict as the Bird Friendly criteria in some aspects. The standards could depend on whether they apply to multiple crops. A list of key habitat and management components that should be considered when making the "shade" standard can be found in the article by Julie Craves, "Why Certifying Shade Coffee is So Complex."[240] I will note that I think the standard should specify the number of shade levels and require that shade trees meet a minimum height– both elements proved to be critical for maintaining high biodiversity. Overall, many agree that streamlining the certification of the shade growth process will improve process transparency and encourage consumer consumption. Although not a quick fix, an official shade standard is the only way that shade will gain more popularity and respect.

7.7 How Should Bird Friendly Coffee be Marketed?: Implementing Effective Measures for Success

The marketing of coffees a sustainable product is a relatively new concept for the coffee industry. For the sustainable coffee industry, the market potential for BFC already exists as demonstrated by the increasing sales and demands for certified coffees. In addition to the suggestion of an official shade standard, this chapter includes recommends additional solutions for the marketing of BFC. Because BFC is in the introduction stage of its product life cycle, the

[239] Rice, "The Global," Smithsonian's National Zoo & Conservation Biology Institute.
[240] Julie Craves, "Why Certifying Shade Coffee is so Complex," Coffee & Conservation, last modified February 3, 2008, http://www.coffeehabitat.com/2008/02/why-certifying/.

overall marketing objective should be to create awareness and the promotion objective should be to inform.

The success of the sustainable coffee market and coffee eco-labels depends on:

(1) Consumer awareness: an accurate and clearly understood meaning of the certification and recognition of the label
(2) Consumers' understanding and perception of the link between product choice and environmental impact
(3) Consumer-driven demand
(4) An official definition of shade
(5) The credibility of the initiative providing the certification
(6) Transparency, essential for building consumer trust
(7) Support from NGOs, conservation groups and aid organizations
(8) Successful advertising and branding
(9) Product convenience

7.7.1 The Smithsonian Migratory Bird Center's Marketing Advantages

There is potential contention between efforts to scale up certification and efforts to apply more stringent environmental requirements. If the SMBC, adds crops other than coffee such as, cocoa or bananas, it may lead to same problem Rainforest Alliance has faced. Because the RA certifies nine agroforestry crops, it is understandable that standards have been modified. However, the RA has changed its standards so much, that it is no longer truly shade-grown coffee. The risk to rigorous standard systems "is not only that market actors could try to water down such standards (if they are perceived as being too costly) but that they would abandon rigorous standards altogether and pursue sustainability objectives through weaker standards, other channels, or not at all."[241] The SMBC is committed to its stringent standards and is not considering adding crops as of now. BFC could set the industry standard and play "a critical role

[241] Tscharntke et al., "Conserving Biodiversity," 18.

as a focal actor in advancing the value position of high-biodiversity coffee within the coffee market through applying more stringent biodiversity criteria."[242]

Second, the SMBC believes in holding everyone along the commodity chain to the highest standards, so that they can deliver a credible and reliable product. Therefore, the SMBC requires 100% of packaged beans to be BF certified.

Third, a market advantage for BFC is that organic is a prerequisite. Organic is popular among roasters and consumers.[243]

Lastly, the SMBC shares its expertise through scientific studies and publications. The organization invests heavily in research of migratory birds and provides helpful information for consumers. In addition to these strengths, certification by a third party makes BFC credible.

7.7.2 Raising Awareness Through Education

In a constantly evolving coffee market, consumer awareness and accessibility are paramount to the growth of the shade-grown coffee market. Successfully promoting BFC involves changing consumers' perspectives, and tapping into market-based conservation continues to be the way forward. Educating more coffee consumers about the benefits of shade-grown coffee, especially BFC, is crucial to building demand. Consumers should support producers that adopt biodiversity-friendly practices by purchasing BFC. The challenge is to increase demand so that certified BF producers and potential BFC growers will have a market to supply. Below are suggestions of various ways to educate consumers to create demand.

[242] Cecilia Soler, Cecilia Sandstrom, and Hanna Skoog, "How Can High-Biodiversity Coffee Make It to the Mainstream Market? The Performativity of Voluntary Sustainability Standards and Outcomes for Coffee Diversification," *Environmental Management* 59, no. 2 (November 12, 2016): 230, NCBI.
[243] Shriver, "Bird Friendly," Daily Coffee News.

Educating Farmers: Because there is no official shade standard, there is a need for a widespread educational campaign to establish a single definition of shade. The unfamiliarity of shade standards and the certification processes inhibit increased production. Thus, retailers carry unverified "shade" coffees. Farmers should attend educational workshops, co-op sponsored events and training programs offered by various organizations. Farmers need to understand and value the importance of good management practices.[244]

Education Programs for Students: Empowering younger students and older grade levels with skills, knowledge and tools to make a positive difference is vital for global bird survival. Education programs that use neo-tropical migratory birds as a theme to enhance environmental and cultural awareness will ultimately create conscious consumers. For instance, the SMBC Bridging the Americas cross-culture environmental program partners elementary school classes in Virginia, Washington, D.C., and Maryland with classes in Latin America. The program teaches students that migratory birds are dependent upon habitats across the Americas. Understanding that these communities are linked through migratory bird patterns enables children to contemplate the environmental conditions of the countries in Latin America.[245] Thus, if children in the U.S. "understand that a bird that they can see in their own backyard travels thousands of miles to Nicaragua, it encourages them to think "what is it like where that bird goes, and who lives there?"[246] Overall, through educational programs, students will have a greater appreciation for birds and help ensure a future that continues to be enriched with diverse and abundant populations.

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[244] Pojman, "Shade-Grown Coffee," Fresh Cup Magazine.
[245] Smithsonian, "Earth Optimism: Bridging the Americas," Smithsonian's National Zoo & Conservation Biology Institute, last modified March 31, 2017, https://nationalzoo.si.edu/migratory-birds/news/earth-optimism-bridging-americas.
[246] Ibid.

Coffee Conventions, Seminars, & Caffeine Crawls: BFC needs to be an increasing focus of lectures, coffee conventions and coffee crawls. For instance, ICO brings together leading experts to present the latest developments on different coffee topics. ICO's presentations and reports that are posted on their website, and thus if they post a presentation of BFC it would enables widespread dissemination of information.[247] Jason Burton of The LAB notes that coffee sustainability is a big topic at coffee crawls and conferences, but BF is mentioned sporadically.[248] If large players emphasize BFC at conventions, etc., then awareness will increase.

NGOs: Another key to making the Bird Friendly label work depends on consumer advocacy groups' (NGOs) work to raise awareness. Educational campaigns can make a significant impact on consumer behavior toward consumption of shade-grown coffee.[249]

For example, the help of Audubon societies is key for increasing awareness among bird-lovers and environmentally conscious consumers. These societies can educate consumers on shade-grown coffee production through website posts or seminars to influence their audience. For instance, Audubon North Carolina featured the Mecklenburg Audubon Society's (a chapter within North Carolina) article, "Why Should You Drink Bird-Friendly Coffee?" The article informs the reader about where to find BF vendors and which roasters the organization prefers.[250] Additionally, the SMBC has looked to birding organizations for help. In an interview with Robert Rice of the SMBC in 2015, he commented, "We [SMBC] are currently in a ramped

[247] International Coffee Organization, "Disseminating Knowledge," International Coffee Organization, http://www.ico.org/knowledge_e.asp.
[248] Burton, e-mail interview by the author.
[249] Fleischer, "Toward More," Rural Development Department: The World Bank.
[250] Audubon North Carolina Staff, "Mecklenburg Audubon-Why Should You Drink Bird-Friendly Coffee?," Audubon North Carolina, last modified February 27, 2014, http://nc.audubon.org/news/chapter-month-mecklenburg-audubon-why-should-you-drink-bird-friendly-coffee.

up campaign to go after birding organizations,"[251] such as the American Birding Association and the American Bird Conservancy.

Moreover, a BFC focused article posted on the website of a prominent and reliable NGO such as SCAA would enable widespread dissemination of information. Moreover, non-profits within the coffee industry are instrumental in building a more sustainable coffee sector and raising consumer awareness.

Governments: The potential of shade-grown coffee in today's market could grow by 5% simply through encouragement by government institutions. The International Coffee Organization (ICO), the main intergovernmental organization for coffee, could play a huge role because it releases educational documents on the coffee market and hosts global meetings to discuss the market and how to protect and expand it.[252] If ICO published an educational guide on BFC and how to successfully sell it, then an education of the masses would occur that would inform all actors in the coffee value chain on how to reach their potential consumer base.[253] Ultimately, government organizations can effectively educate and empower consumers to make more impactful choices about coffee consumption.

Coffee Companies and Advertising: Coffee companies, such as retailers, play a pivotal role in educating consumers by providing the options from which consumers choose their purchases. Consumers acquainted with certain stores entrust their purchasing power to these retailers, which enables retailers significantly in the purchasing decision. For example, the BFC retailer, Birds & Beans, actively engages consumers about BFC and constantly posts on Instagram. For instance, Birds & Beans created a video about BFC and asks all viewers to pass it

[251] Shriver, "Bird Friendly," Daily Coffee News.
[252] Word Press, "Shade Grown," Debating Science: The University of Massachusetts Amherst.
[253] Ibid.

along to spread the word as to why BFC is so important. Other retailers should show their passion for serving BFC and create awareness for such production through similar initiatives.[254]

BFC retailers should place promotional materials at the point of sale and on packaging to give information may be effective. One study found that printing short, sharp facts on to-go cups was the most effective coffee education channel.[255] It allows a consumer to take the message away with them.

Lastly, coffee companies play a vital role in demonstrating that high quality can go hand and hand with sustainability. Overall, it is clear that retail venues that sell BFC need to better inform their costumers about the shade-grown, organic option.[256]

7.7.3 Creating Demand

As coffee drinkers and bird lovers, one of the most powerful things people can do is spread positivity regarding BFC. Birders should assert themselves in the marketplace and create awareness by showing retailers that there is a strong market for BFC.[257] Consumers can make a difference by asking retailers to stock BFC by regularly purchasing it, thanking retailers who stock BFC, and giving a ready-made flyer to retailers who you would like to sell BFC.

7.7.4 A Social Media Presence

Social media allows for a direct and immediate relationship with the consumer and is an efficient platform for reaching a larger number of people. The SMBC should improve its social media presence by creating a BFC-specific Facebook, Instagram, Twitter account, and frequently posting on its blog. Facebook and Instagram are best for images while, Twitter and a blog are a

[254] "Birds & Beans: Wake up and Save the Birds," India Retail News, last modified May 15, 2012.
[255] "Marketing Specialty: Why Is Coffee Education Boring?," Perfect Daily Grind, last modified April 28, 2016, https://www.perfectdailygrind.com/2016/04/marketing-specialty-coffee-education-boring/.
[256] Messer, Kotchen, and Moore, "Can Shade-Grown," 130.
[257] Axelson, "In Colombia," Cornell Lab of Ornithology.

better medium for social commentary. With a complicated subject like shade-grown coffee, the SMBC needs to constantly post information that educates the consumer. By providing frequent and truthful information, consumers will eventually respond.

The three vital ingredients for social media success in specialty coffee include: (1) awareness; (2) personality; and (3) relationship.[258] Because coffee is a low-involvement product, organizations and companies need to make consumers passionate about BFC without boring them or tiring them, they must help them learn without it feeling like a chore. For instance, telling relevant, factual stories and providing short, sharp facts engages consumers to want to learn more about coffee. Marketing BFC is not about forcing people to listen, it is about effectively converting consumers into informed coffee-drinkers, providing a starting point for them to explore their own coffee journey.

Lastly, hashtags or mediadata tags are incredibly valuable for lesser known companies and organizations because it exposes their posted content to a wider audience. They are helpful for succinct communication and are searchable by all users, which allows users who are not following your account to see your content. Some potential examples of hashtags to be employed include: #BirdFriendlyCoffee, #ShadeGrown, #Organic, #FightDeforestation, or #SustainableCoffee. Below I created a mock Instagram account for the SMBC's BFC (Figure 14).

Overall, the coffee industry possesses significant potential for positively impacting ecosystems; however, what will be challenging is communicating sustainability practices and values in a clear and concise, which will allow consumers to make more informed decisions without overwhelming them with information.

[258] K. van der Merwe, "Coffee Marketing: How to Achieve Social Media Success," Perfect Daily Grind, last modified September 23, 2016, https://www.perfectdailygrind.com/2016/08/coffee-marketing-achieve-social-media-success/.

Figure 14: Mock Instagram account[259]

7.8 Target Markets

Initial marketing efforts for shade-grown coffee have targeted consumers in specialty coffee markets. Shade-grown coffee buyers often earn more in income, retain stronger beliefs regarding conservation and participate in environmental organizations more frequently.[260] Current buyers of shade-grown coffee remain limited compared to the entire population of specialty coffee buyers. The market for shade-grown and organic coffee can be split into three

[259] Laura Rathmell, *Mock Instagram Account*, image, April 26, 2017, digital file.
[260] Messer, Kotchen, and Moore, "Can Shade-Grown," 127.

segments: (1) consumers who currently purchase shade-grown/organic coffee; (2) consumers who do not purchase shade-grown/organic, but have indicated that they are willing to purchase; and (3) consumers who do not purchase shade-grown/organic coffee and are unlikely to buy in the future.[261] The growth of shade-grown coffees, particularly BFC, shows promise for the potential market for shade-grown coffee. While overall consumer awareness is the objective, the SMBC should mainly target bird-lovers and millennials.

7.8.1 Bird Watchers as a Market Opportunity

Given that birding is the second most popular hobby and that there are 46 million bird watchers in America, this potential market segment for BFC is substantial.[262] If 57% of Americans drink coffee daily, then there could be more than 26 million coffee-drinkers who care about birds, or about 17% of the American coffee market.[263] "If every birder in the U.S. committed to drinking Bird Friendly coffee, the market would grow 1,000-fold," said Bill Wilson, owner of Birds & Beans.[264] Birders are more inclined to spend on conservation, since birders likely know that bird populations are declining globally.[265]

However, clearly millions of bird watchers are unwilling to pay a premium to ensure that their coffee supports the birds they are watching, photographing and enjoying. Julie Craves, author of the website, Coffee & Conservation, provides a detailed analysis and criticism for why birders drink Folgers, even though studies show most birders are affluent.[266] She believes that if birders are willing to spend money on traveling to see birds, they should be buying BFC. Despite

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[261] Ibid., 129.
[262] Axelson, "Making Sense," Cornell Lab of Ornithology.
[263] Amanda D. Rodewald, "Connecting To Our Planet: Birds Offer a Connection to Tens of Millions of Coffee Drinkers," *Coffee Talk*, April 2017, 28.
[264] Axelson, "Making Sense," Cornell Lab of Ornithology.
[265] Rodewald, "Connecting To Our Planet," 30.
[266] Julie Craves, "When Birders Drink Folgers, Part 2," Coffee & Conservation, last modified May 16, 2009, http://www.coffeehabitat.com/2009/05/when-birders-drink-folgers-part-2/.

low numbers, increasing awareness and promotion from Audubon societies are key to attracting more birdwatchers. Overall, if bird lovers create a critical mass of BFC drinkers, measurable impacts on bird populations and an increase in the demand for BFC would be realized.

7.8.2 Millennials as a Market Opportunity

Millennials (18 to 40 years old), whose purchasing power is climbing, represent the most promising growth segment of the coffee market. Millennials are conscientious shoppers who cite sustainability as a key driver of their coffee purchasing decisions. For instance, market research by the National Coffee Drinking Trends Association (NCDT) found that "sustainability" is the most attractive brand attribute among millennials, and a large majority (66%) are willing to pay more for sustainable coffee. Yet, only 28% of millennials surveyed knew what sustainability meant in regards to coffee.[267] This suggests an untapped communication opportunity for the industry. Some believe that this is where birds come in, as they represent "a sustainability indicator for the lucrative millennial market."[268] If millennials who consume coffee are combined with birders who consume coffee, then the potential market blossoms to more than 50 million in the U.S. alone, which represents more than one-third of the entire market for coffee in the U.S.[269]

7.9 Conclusion

The likelihood that the certification of shade coffee production can increase coffee consumers' perspectives on conservation and biodiversity in terms of coffee production is predicated on a plethora of factors discussed in this chapter. The success of BFC depends on the willingness of coffee consumers and coffee roasters to pay price premiums for high-biodiversity

[267] "What Are We Drinking?," The First Pull: National Coffee Association USA.
[268] Rodewald, "Connecting To Our Planet," 30.
[269] Ibid.

coffee. Until recently, certified organic products were not readily available on store shelves, but now organic branding is a major factor influencing consumers' decisions. Perhaps BFC will follow the same path as organic and realize higher consumer participation and greater accessibility. Moreover, the growing sustainable coffee sector is a bright spot in the overall gloomy picture of international trade: "the shining light in the murky depths of your mug." This is the one addiction you can feel good about.[270]

Making responsible decisions that extend beyond fiscal margins is important to sustainability and conservation alike. Buying on price alone empowers mass retailers and large corporations to dictate buying patterns that give little credence to environmental integrity. Coffee produced in conditions that decimate forests and eliminate animal habitats damages the environment irreparably. Coffee consumers represent a significant market segment and billions of dollars annually, so the sourcing and consumption of sustainably grown coffee answers questions about environmental degradation and the impact of agriculture on the plant.[271] The responsibility to protect the world is paramount, and the assumed cheapness of mass-manufactured coffee ignores the environmental costs of manipulating and exploiting the lands for cost savings.

[270] Dicum and Luttinger, *The Coffee*, 210.
[271] Kammermeier, "Bird-Friendly Coffee," Laura Kammermeier: Writer, Biologist, Digital Strategist.

Chapter 8

Final Grounds

In conclusion, for coffee to be successful in the long term, it is not enough for coffee production and processing to become environmentally sustainable. Coffee production also needs to be socially and economically sustainable, as well as properly marketed. While BFC provides refuge for an array of flora and fauna, the certification is not profitable for small-scale farmers. Furthermore, the lack of consumer knowledge about certification and lack of demand are considered to be important barriers for the expansion of the BFC market. Expanding the market for shade-grown coffee, especially BFC, requires increased consumer awareness through an official shade standard, education and promotion.

Agriculture is the most impactful human activity on the planet, bar none. We are no passive bystanders to impressive natural phenomenon of bird migration. Our coffee decisions make us an active participant, because at least 42 migrant species are coming from coffee farms. But not just any coffee farm will do. So, the next time you are deciding between decaf or regular, black or cream and sugar, you also need to ask: sun or shade-grown?

REFERENCES

Audubon North Carolina Staff. "Mecklenburg Audubon-Why Should You Drink Bird-Friendly Coffee?" Audubon North Carolina. Last modified February 27, 2014. http://nc.audubon.org/news/chapter-month-mecklenburg-audubon-why-should-you-drink-bird-friendly-coffee.

Axelson, Gustave. "Bird Friendly Coffee Now Available At A Major Retailer." Cornell Lab of Ornithology. Last modified October 9, 2012. https://www.allaboutbirds.org/bird-friendly-coffee-now-available-at-a-major-retailer/.

———. "In Colombia, Shade-Grown Coffee Sustains Songbirds and People Alike." Cornell Lab of Ornithology. Last modified October 11, 2016. https://www.allaboutbirds.org/in-colombia-shade-grown-coffee-sustains-songbirds-and-people-alike/.

———. "Making Sense Of Coffee Labels: Does Your Coffee Support Wintering Warblers?" Cornell Lab of Ornithology. Last modified October 9, 2012. https://www.allaboutbirds.org/making-sense-of-coffee-labels-shade-grown-organic-fair-trade-bird-friendl/.

Bakermans, Marja H., Amanda D. Rodewald, Andrew C. Vitz, and Carlos Rengifo. "Migratory Birds Use of Shade Coffee: The Role of Structural and Floristic Features." *Springer*, April 11, 2011, 85-94. ScienceDirect.

Bali, Archana, Ajith Kumar, and Jagdish Krishnaswamyb. "The Mammalian Communities in Coffee Plantations around a Protected Area in the Western Ghats, India." *Biological Conservation* 139, nos. 1-2 (June 17, 2007): 93-102. ScienceDirect.

Berard, Tina. E-mail interview by the author. February 14, 2017.

Berhanu, Mehari. E-mail interview by the author. March 13, 2017.

Bichier, Peter, and Stacy M. Philpott. "Effects of Shade Tree Removal on Birds in Coffee Agroecosystems in Chiapas, Mexico." *Agriculture, Ecosystems & Environment* 149 (March 2012): 171-80. ScienceDirect.

"Bird Friendly Coffee." Ethical Coffee. http://www.ethicalcoffee.net/bird.html.

"Bird List." Smithsonian's National Zoo & Conservation Biology Institute. https://nationalzoo.si.edu/migratory-birds/bird-friendly-coffee-bird-list.

Birds and Beans Inc. "Gaia Estate – A Bird Friendly® Coffee Grower's Perspective." Birds and Beans. Last modified September 27, 2012. https://birdsandbeans.ca/gaia-estate-a-bird-friendly-coffee-growers-perspective/.

"Birds & Beans: Wake up and Save the Birds." India Retail News. Last modified May 15, 2012.

"A Botanist's Guide to Specialty Coffee." Specialty Coffee Association of America. http://scaa.org/index.php?goto=&page=resources&d=a-botanists-guide-to-specialty-coffee.

Buechley, Evan. "Why Shade-Grown Coffee is Good for Birds and Farmers." The Conversation. Last modified February 26, 2015. https://theconversation.com/why-shade-grown-coffee-is-good-for-birds-and-farmers-37567.

Buechley, Evan R., Cagan H. Sekercioglu, Anagaw Atickem, Gelaye Gebremichael, James Kuria Ndungue, Bruktawit Abdu Mahamued, Tifases Beyene, Tariku Mekonnen, and Luc Lens. "Importance of Ethiopian Shade Coffee Farms for Forest Bird Conservation." *Biological Conservation* 188 (August 2015): 50-60. ScienceDirect.

Burton, Jason. E-mail interview by the author. February 15, 2017.

Caudill, S. Amanda, Fabrice DeClerck, and Thomas P. Husband. "Connecting Sustainable Agriculture and Wildlife Conservation: Does Shade Coffee Provide Habitat for Mammals?" *Agriculture, Ecosystems & Environment* 199 (January 1, 2015): 85-93. ScienceDirect.

Coffee & Conservation. Last modified April 1, 2010. http://www.coffeehabitat.com/2010/04/research-birds-reduce-coffee-pests-in-jamaica/.

"Coffee Market in the U.S. - Statista Dossier." *Statista*, 2016. PDF.

"Coffee, Roasted." *Encyclopedia of Global Industries*, 2011, 424-35.

Coffee Talk Media. "Organic Certification — Not Only Relevant Today, But Vital." Coffee Talk Magazine. Last modified March 19, 2012. http://coffeetalk.com/ctmagazine/03-2012/2623/.

Craves, Julie. "The (De)evolution of Rainforest Alliance Shade Criteria." Coffee & Conservation. Last modified March 7, 2014. http://www.coffeehabitat.com/2014/03/ra-shade-criteria-change/.

———. "Eco-Certified Coffee: How Much is There?" Coffee & Conservation. Last modified February 2017. http://www.coffeehabitat.com/2011/05/market-shares-2010/.

———. "Farmers Are Abandoning Organic Coffee- and It's Your Fault." Coffee & Conservation. Last modified January 11, 2010.

http://www.coffeehabitat.com/2010/01/farmers-are-abandoning-organic-coffee-and-its-your-fault/.

———. "How Much Does Eco-Certification Cost?" Coffee & Conservation. Last modified April 11, 2011. http://www.coffeehabitat.com/2011/04/cost-of-eco-certification/.

———. "Know Your Coffee Birds: Baltimore Oriole." Coffee & Conservation. Last modified July 9, 2009. http://www.coffeehabitat.com/2009/07/coffee-birds-baltimore-oriole/.

———. "Know Your Coffee Birds: Scarlet Tanager." Coffee & Conservation. Last modified November 23, 2011. http://www.coffeehabitat.com/2011/11/coffee-bird-scarlet-tanager/.

———. "More on the Purity of Certified Coffees." Coffee & Conservation. Last modified July 14, 2009. http://www.coffeehabitat.com/2009/07/more-on-the-purity-of-certified-coffees/.

———. "The New Rainforest Alliance Shade Requirements." Coffee & Conservation. Last modified February 2, 2017. http://www.coffeehabitat.com/2017/02/new-rainforest-alliance-shade-requirements/.

———. "Pesticides Used on Coffee Farms." Coffee & Conservation. Last modified December 15, 2006. http://coffeehabitat.com/2006/12/pesticides_used_3/.

———. "The Power of Organic Coffee." Coffee & Conservation. Last modified December 8, 2016. http://coffeehabitat.com/2016/12/scaa-organic-coffee/.

———. "Quick Look at Differing Shade Criteria." Coffee & Conservation. Last modified 2017. http://www.coffeehabitat.com/2007/07/quick-look-at-d/.

———. "What Does 'Organic' Really Mean?" Coffee & Conservation. Last modified August 4, 2011. http://coffeehabitat.com/2011/08/what-does-organic-really-mean/.

———. "What Is Shade-Grown Coffee?" Coffee & Conservation. Last modified February 6, 2006. http://www.coffeehabitat.com/2006/02/what_is_shade_g/.

———. "When Birders Drink Folgers, Part 2." Coffee & Conservation. Last modified May 16, 2009. http://www.coffeehabitat.com/2009/05/when-birders-drink-folgers-part-2/.

———. "When is 100% not 100%?" Coffee & Conservation. Last modified June 20, 2009. http://www.coffeehabitat.com/2009/06/when-is-100-not-100/.

———. "Why Certifying Shade Coffee is so Complex." Coffee & Conservation. Last modified February 3, 2008. http://www.coffeehabitat.com/2008/02/why-certifying/.

Cruz-Angon, Andrea, and Russell Greenburg. "Are Epiphytes Important for Birds in Coffee Plantations? An Experimental Assessment." *Journal of Applied Ecology* 42, no. 1 (February 2005): 150-59. JSTOR.

Daviron, Benoit, and Stefano Ponte. *The Coffee Paradox: Global Markets, Commodity Trade, and the Elusive Promise of Development*. New York, NY: Zed Books Ltd., 2005.

Deinlein, Mary. "Neo-Tropical Bird Basics." Smithsonian's National Zoo & Conservation Biology Institute. Last modified January 1, 1999. https://nationalzoo.si.edu/migratory-birds/news/neotropical-migratory-bird-basics.

Dicum, Gregory, and Nina Luttinger. *The Coffee Book*. New York, NY: New Press, 2006. ProQuest Ebook Central.

Donahue, Michelle. "Bird Friendly Coffee Gives a Paw-Up to Small Mammals as Well." Smithsonian Insider. Last modified March 1, 2017. http://insider.si.edu/2017/03/mice-mocchato-bird-friendly-coffee-gives-paw-small-mammals-well/.

Douglas, D. J., D. Nalwanga, R. Katebaka, P. W. Atkinson, D. E. Pomeroy, D. Nkuutu, and J. A. Vickery. "The Importance of Native Trees for Forest Bird Conservation in Tropical Farmland." *Animal Conservation* 17, no. 3 (June 2014): 256-64. Wiley.

Earley, Katharine. "Cafeology Cultivates Bird-Friendly Coffee." The Guardian. Last modified April 30, 2015. https://www.theguardian.com/sustainable-business/2015/apr/30/cafeology-cultivates-bird-friendly-coffee.

EarthEasy. http://eartheasy.com/eat_shadegrown_coffee.htm.

Echeverria, Dariush. E-mail interview by the author. March 11, 2017.

Estrada, Carlos G., Anne Damon, Cornelio S. Herandez, Lorena S. Pinto, and Guillermo I. Nunez. "Bat Diversity in Montane Rainforest and Shaded Coffee Under Different Management Practices in Southeastern Chiapas, Mexico." *Biological Conservation* 132 (June 2006): 351-61. ScienceDirect.

Fleischer, Gerd. "Toward More Sustainable Coffee: Consumers Fuel Demand For More Sustainable Agriculture." Rural Development Department: The World Bank. Last modified June 2002. http://documents.worldbank.org/curated/en/430971468739806516/pdf/multi0page.pdf.

Freeman Trading. "Mission." Freeman Trading. https://www.freemantradingltd.com/mission.

"From Bean to Cup: How Consumer Choice Impacts upon Coffee Producers and the Environment." *Consumers International and International Institute for Environment and Development*, December 2005.

http://www.consumersinternational.org/media/306514/coffee%20report%20%28english%29.pdf.

Gallego, Cristina, and I. Armbrecht. "Testing Ant Predation on the Coffee Berry Borer in Shaded and Sun Coffee Plantations in Colombia." *Entomologia Experimentalis Et Applicata* 124 (September 2007): 261-67. Academic OneFile.

Giovannucci, Daniele. "The State of Sustainable Coffee: A Study of Twelve Major Markets." International Institute for Sustainable Development. Last modified July 2003. http://www.iisd.org/pdf/2003/trade_state_sustainable_coffee.pdf.

Gobbi, Jose A. "Is Biodiversity-Friendly Coffee Financially Viable? An Analysis of Five Different Coffee Production Systems in Western El Salvador." *Ecological Economics*, no. 33 (2000): 267-81. ScienceDirect.

Heath, Thomas. "Look How Much Coffee Millennials Are Drinking." *The Washington Post*, October 31, 2016. Gale Virtual Reference Library.
This article discusses the increasing in coffee consumption in millennials.

"Importers, Roasters and Distributors." Smithsonian's National Zoo & Conservation Biology Institute. https://nationalzoo.si.edu/migratory-birds/bird-friendly-coffee-importers-roasters-and-distributors.

International Coffee Organization. "Disseminating Knowledge." International Coffee Organization. http://www.ico.org/knowledge_e.asp.

Jezeer, Rosalien, and Pita Verweij. "Shade-Grown Coffee: Double Dividend for Biodiversity and Small-Scale Farmers in Peru." *Hivos, The Hague, the Netherlands*, 2015. https://hivos.org/sites/default/files/shade_grown_coffee_report-biodiversity_business_subpage.pdf.

Jha, Shalene, Christopher M. Bacon, Stacy M. Philpott, V. Ernesto Mendez, Peter Laderach, and Robert A. Rice. "Shade Coffee: Update on a Disappearing Refuge for Biodiversity." In *BioScience*. N.p.: Oxford University Press, n.d. Excerpt from *BioScience*, 5th ser., 64 (May 2014): 416-28.

Jha, Shalene, and Christopher W. Dick. "Shade Coffee Farms Promote Genetic Diversity of Native Trees." *Current Biology* 18, no. 24 (December 23, 2008): R1126-R1128. https://www.ncbi.nlm.nih.gov/pubmed/19108765.

Jha, Shalene, and J. H. Vandermeer. "Impacts of Coffee Agroforestry Management on Tropical Bee Communities." *Biological Conservation* 143 (2010): 1423-31. ScienceDirect.

Johnson, J. L., A. M. Stercho, and S. C. Hackett. "Ecological and Economic Services Provided by Birds on Jamaica Blue Mountain Coffee Farms." *Conservation Biology* 22:1177-85. ScienceDirect.

Kammermeier, Laura. "Bird-Friendly Coffee: Why are YOU waiting?" Laura Kammermeier: Writer, Biologist, Digital Strategist. Last modified January 26, 2011. http://laurakammermeier.com/bird-friendly-coffee-why-are-you-waiting/comment-page-1/.

Karp, Daniel S., Chase D. Mendenhall, Randi Figureoa Sandi, Nicolas Chaumont, Paul R. Ehrlich, Elizabeth A. Hadley, and Gretchen C. Daily. "Forest Bolsters Bird Abundance, Pest Control and Coffee Yield." *Ecology Letters*, August 4, 2013, 1-9. ScienceDirect.

Kim, Woo Gon, Yoon Jung Jang, and Hae Young Lee. "Coffee Shop Consumers' Emotional Attachment and Loyalty to Green Stores: The Moderating Role of Green Consciousness." *International Journal of Hospitality Management* 44 (January 2015): 146-56.

Kubota, Lily. "Why Does Shade Matter?" The Specialty Coffee Chronicle. Last modified April 10, 2012. http://scaa.org/chronicle/2012/04/10/why-does-shade-matter/.

Lima, Fernando. E-mail interview by Laura Rathmell. March 10, 2017.

Loureiro, Maria L., and Justus Lotade. "Do Fair Trade and Eco-Labels in Coffee Wake up the Consumer Conscience?" *Ecological Economics* 53, no. 1: 129-38. ScienceDirect.

Lovgren, Stefan, ed. "Are Birds Best Hope for Pest-Ridden Coffee Crops?" National Geographic. Last modified August 26, 2008. http://news.nationalgeographic.com/news/2008/08/080826-jamaica-coffee-birds-missions.html.

"Marketing Specialty: Why Is Coffee Education Boring?" Perfect Daily Grind. Last modified April 28, 2016. https://www.perfectdailygrind.com/2016/04/marketing-specialty-coffee-education-boring/.

Messer, Kent D., Matthew J. Kotchen, and Michael R. Moore. "Can Shade-Grown Coffee Help Conserve Tropical Biodiversity? A Market Perspective." *Endangered Species* 17, no. 6 (2000): 125-31. Cornell University.

"Monteverde Area Bird Checklist." Exotic Birding. http://www.exoticbirding.com/costarica/monteverde/checklist.html.

National Oceanic and Atmospheric Administration. "Shade-Grown Coffee Protects Coral Reefs in Puerto Rico." NOAA Coral Reef Conservation Program. http://coralreef.noaa.gov/aboutcrcp/news/featuredstories/may15/shadecoffee.html.

Nosowitz, Dan. "This Tree Could Make Coffee Plantations More Profitable And More Environmentally Sound." Modern Farmer. Last modified November 21, 2016. http://modernfarmer.com/2016/11/tree-make-coffee-plantations-profitable-environmentally-sound/.

"Organic Market Analysis." Organic Trade Association. https://www.ota.com/resources/market-analysis.

"Our Mission." TechnoServe: Business Solution to Poverty. http://www.technoserve.org.

Pendergrast, Mark. *Uncommon Grounds*. Rev ed. Philadelphia, PA: Basic Books, 2010.

Perfecto, Ivette, John Vandermeer, Alex Mas, and Lorena Soto Pinto. "Biodiversity, Yield, and Shade Coffee Certification." *Ecological Economics* 54, no. 4 (September 15, 2005): 435-46. ScienceDirect.

Philpott, Stacy M., and Peter Bichier. "Effects of Shade Tree Removal on Birds in Coffee Agroecosystems in Chiapas, Mexico." *Agriculture, Ecosystems & Environment* 149 (March 1, 2012). ScienceDirect.

Plant Collections Department of the San Francisco Botanical Garden Society. "What Are Cloud Forests?" Cloud Forests: Conserving Our Botanical Treasures. http://www.sfbotanicalgarden.org/cf/cf/.

Pojman, April. "Shade-Grown Coffee: Helping an Industry Turn Over a New Leaf." Fresh Cup Magazine. Last modified May 2002. https://www.organicconsumers.org/old_articles/starbucks/shade_grown_coffee.php.

Ponte, Stefano, and Daniele Giovannucci. "Standards as a New Form of Social Contract? Sustainability Initiatives in the Coffee Industry." *Food Policy* 30, no. 3 (June 2005): 284-301. ScienceDirect.

Potts, Jason, Matthew Lynch, Ann Wilkings, Gabriel Huppe, Maxine Cunningham, and Vivek Voora. "The State of Sustainability Initiatives Review 2014: Standards and the Green Economy." The International Institute for Sustainable Development =. Last modified 2014. http://www.iisd.org/sites/default/files/pdf/2014/ssi_2014.pdf.

Potts, Jason, Jessica van der Meer, and Jaclyn Daitchman. "The State of Sustainability Initiatives Review 2010: Sustainability and Transparency. International Institute for Sustainable Development." *A Joint Initiative of IISD, IIED, Aidenvironment, UNCTAD and ENTWINED*, November 2010. http://www.iisd.org/sites/default/files/publications/ssi_sustainability_review_2010.pdf.

Railsback, Steven F., and Matthew D. Johnson. "Effects of Land Use on Bird Populations and Pest Control Services on Coffee Farms." *PNAS* 111, no. 16 (April 22, 2014): 6109-14. ScienceDirect.

Rainforest Alliance. "What Is A Tropical Forest?" Rainforest Alliance. Last modified August 30, 2012. http://www.rainforest-alliance.org/faqs/what-is-a-tropical-forest.

Rathmell, Laura. *Mock Instagram Account*. Image. April 26, 2017. Digital file.

Rice, Robert. "The Ecological Benefits of Shade-Grown Coffee." Smithsonian's National Zoo & Conservation Biology Institute. Last modified September 2010. https://nationalzoo.si.edu/scbi/migratorybirds/coffee/bird_friendly/ecological-benefits-of-shade-grown-coffee.cfm.

———. "Fruits From Shade Trees in Coffee: How Important Are They?" Abstract. *Agroforest Systems*, April 3, 2011. Smithsonian Migratory Bird Center, Smithsonian Conservation Biology Institute, National Zoological Park.

———. "The Global Market for Bird Friendly® Coffee: 2010." Smithsonian's National Zoo & Conservation Biology Institute. Last modified January 1, 1999. https://nationalzoo.si.edu/scbi/migratorybirds/coffee/bird_friendly/global_market.cfm.

———. "Why Migratory Birds are Crazy for Coffee." Smithsonian's National Zoo & Conservation Biology Institute. Last modified January 1, 1994. https://nationalzoo.si.edu/migratory-birds/news/why-migratory-birds-are-crazy-for-coffee.

Rice, Robert, and Amanda Caudill. "Do Bird Friendly® Coffee Criteria Benefit Mammals? Assessment of Mammal Diversity in Chiapas, Mexico" [PLoS ONE]. *Smithsonian Conservation Biology Institute*, November 26, 2016.

Rice, Robert A. "Agricultural Intensification within Agroforestry: The Case of Coffee and Wood Products." *Agriculture, Ecosystems, and Environment* 128, no. 4 (December 2008): 212-18. ScienceDirect.

———. "In the Pursuit of Sustainability: Lessons from the Coffee Sector." *International Journal of Environmental Protection and Policy* 3, no. 1 (January 2015): 14-19. Science Publishing Group.

Rodewald, Amanda D. "Connecting To Our Planet: Birds Offer a Connection to Tens of Millions of Coffee Drinkers." *Coffee Talk*, April 2017, 28-30.

Santos-Barrera, Georgina, and Nicolas Urbina-Cardona. "The Role of the Matrix-Edge Dynamics of Amphibian Conservation in Tropical Montane Fragmented Landscapes." *Revista Mexicana de Biodiversidad* 82, no. 2 (June 1, 2011).

Savannah, Lola. Telephone interview by the author. March 3, 2017.

Schatz, Robin D. "Cause Marketing 101: How A Massachusetts Coffee Company Educates Consumers To Help Save The Birds." Forbes. Last modified February 28, 2016. https://www.forbes.com/sites/robindschatz/2016/02/28/cause-marketing-101-how-a-small-coffee-company-educates-consumers-to-help-save-the-birds/#2112b17e301b.

ScienceDaily. "Birds Do Better in 'Agroforests' Than on Farms." ScienceDaily. Last modified August 7, 2012. https://www.sciencedaily.com/releases/2012/08/120807101357.htm.

Shriver, Jefferson. "Bird Friendly Certification: Decidedly Good for Birds, But What About Farmers?" Daily Coffee News. Last modified May 27, 2015. http://dailycoffeenews.com/2015/05/27/bird-friendly-certification-decidedly-good-for-birds-but-what-about-farmers/.

Smithsonian. "Bird Friendly Coffee Roasters." Smithsonian's National Zoo & Conservation Biology Institute. https://nationalzoo.si.edu/migratory-birds/bird-friendly-coffee-search.

———. "Bird Friendly Coffee Slideshow." Smithsonian's National Zoo & Conservation Biology Institute. https://nationalzoo.si.edu/migratory-birds/bird-friendly-coffee-slideshow.

———. "Earth Optimism: Bridging the Americas." Smithsonian's National Zoo & Conservation Biology Institute. Last modified March 31, 2017. https://nationalzoo.si.edu/migratory-birds/news/earth-optimism-bridging-americas.

———. "Norms for Production, Processing and Marketing of "Bird Friendly®" Coffee." Smithsonian Migratory Bird Center. https://nationalzoo.si.edu/scbi/migratorybirds/coffee/Norms-English_1.pdf.

Smithsonian's National Zoo & Conservation Biology Institute. Last modified January 1, 1994. https://nationalzoo.si.edu/migratory-birds/news/why-migratory-birds-are-crazy-for-coffee.

Soler, Cecilia, Cecilia Sandstrom, and Hanna Skoog. "How Can High-Biodiversity Coffee Make It to the Mainstream Market? The Performativity of Voluntary Sustainability Standards and Outcomes for Coffee Diversification." *Environmental Management* 59, no. 2 (November 12, 2016): 230-48. NCBI.

"Store Manager Request for Bird Friendly Coffee." Smithsonian's National Zoo & Conservation Biology Institute. https://nationalzoo.si.edu/scbi/migratorybirds/coffee/StoreManagerRequest.pdf.

Suki, Norazah Mohd, Norbayah Mohd Suki, and Nur Shahirah Azman. "Impacts of Corporate Social Responsibility on the Links Between Green Marketing Awareness and Consumer Purchase Intentions." *Procedia Economics and Finance* 37 (2016): 262-68. ScienceDirect.

Sumitomo Corporation. "Bird Friendly® Coffee." Sumitomo Corporation. Last modified March 2017. http://www.sumitomocorp.co.jp/english/business/article/id=245.

"Sustainable Agriculture Standard." Sustainable Agriculture Network. http://sanstandard2017.ag.

T, Edward S., and Wang Jai-Rong Yu. "Effect of Product Attribute Beliefs of Ready-to-Drink Coffee Beverages on Consumer-Preceived Value and Repurchase Intention." *British Food Journal* 118, no. 12 (2016).

Tavares, Ana Paula, and Andre Freitas. "Are Sustainable Farming Certifications Making a Difference?" GreenBiz. Last modified April 28, 2016. https://www.greenbiz.com/article/are-sustainable-farming-certifications-making-difference.

Teague, Elizabeth. "Shade-Grown Coffee: Whats the Big Deal?" Root Capital. Last modified March 25, 2015. https://blog.rootcapital.org/back-roads-to-boardrooms/shade-grown-coffee-whats-the-big-deal.

Thurston, Robert T., Jonathan Morris, and Shawn Steiman. *Coffee: A Comprehensive Guide to the Bean, the Beverage, and the Industry*. Baltimore, MD: Rowman & Littlefiel, 2013.

Titus, Anand, and Geeta N. Pereira. "Honey Bees as Coffee Pollinators." Eco-Friendly Coffee. Last modified June 1, 2016. https://ecofriendlycoffee.org/honey-bees-coffee-pollinators/.

Todo, Yasuyuki, and Ryo Takahashi. "Coffee Certification and Forest Quality: Evidence from a Wild Coffee Forest in Ethiopia." *World Development* 92 (April 2017): 158-66. ScienceDirect.

"Trends in the Trade of Certified Coffees." *International Trade Centre (ITC)*, 2011. PDF. This source compares the various sustainable certification programs and the market.

Tscharntke, Teja, Jeffrey C. Milder, Gotz Schroth, Yann Clough, Fabrice DeClerck, Anthony Waldron, Robert Rice, and Jaboury Ghazoul. "Conserving Biodiversity Through Certification of Tropical Agroforestry Crops at Local and Landscape Scales." *Conservation Letters*, January/February 2015, 14-23. Wiley.

Tucker, Catherine M. *Coffee Culture: Local Experiences, Global Connections*. New York, NY: Routledge, 2011.

University of California Santa Cruz NEWSCENTER. Last modified May 7, 2014. http://news.ucsc.edu/2014/05/shade-grown-coffee.html.

The University of Texas at Austin. "Shade Grown Coffee Shrinking as a Proportion of Global Coffee Production." *UT News: The University of Texas at Austin*. Last modified April 16, 2014. https://news.utexas.edu/2014/04/16/global-production-of-shade-grown-coffee-shrinking.

Valencia, Vivian, Paige West, Luis García-Barrios, Eleanor J. Sterling, and Shahid Naeem. "The Role of Coffee Agroforestry in the Conservation of Tree Diversity and Community Composition of Native Forests in a Biosphere Reserve." *Agriculture, Ecosystems & Environment* 189, no. 1 (March 24, 2014): 154-63. ScienceDirect.

van der Merwe, K. "Coffee Marketing: How to Achieve Social Media Success." Perfect Daily Grind. Last modified September 23, 2016. https://www.perfectdailygrind.com/2016/08/coffee-marketing-achieve-social-media-success/.

Van Loo, Ellen J., Vincenzina Caputo, Rodolfo M. Nayga, Jr., Han-Seok Seo, Baoyue Zhang, and Wim Verbeke. "Sustainability Labels on Coffee: Consumer Preferences, Willingness-to-pay and Visual Attention to Attributes." *Ecological Economics* 118 (October 2015): 215-25. ScienceDirect.

Vellema, W., A. Buritica Casanova, C. Gonzalez, and M. D'Haese. "The Effect of Specialty Coffee Certification on Household Livelihood Strategies and Specialisation." *Food Policy* 57 (November 2015): 13-25. ScienceDirect.

Warrier, Gopikrishna. "Indian Farmers Boost Income and Biodiversity by Mixing Coffee with Honey." Revitalization News. Last modified January 1, 2017. https://revitalizationnews.com/article/indian-farmers-boost-income-biodiversity-mixing-coffee-honey/.

"What Are We Drinking? Understanding Coffee Consumption Trends." The First Pull: National Coffee Association USA. Last modified March 19, 2016. https://nationalcoffeeblog.org/2016/03/19/coffee-drinking-trends-2016/.

Whelan, Tensie, and Deanna Newsom. "Sustainable Coffee Farming: Improving Income and Social Conditions Protecting Water, Soil and Forests." *Rainforest Alliance*, May 2014. PDF.

Word Press. "Shade Grown Coffee, Not Just for the Birds." Debating Science: The University of Massachusetts Amherst. Last modified December 6, 2013. https://blogs.umass.edu/natsci397a-eross/shade-grown-coffee-not-just-for-the-birds-2/.

Wright, Julie. "Shade-Grown Coffee Yields a Better Product and Top-Notch Wildlife Habitat." United States Department of Agriculture: Natural Resources Conservation Service. Last modified June 30, 2016. https://www.nrcs.usda.gov/wps/portal/nrcs/blogdetail/nrcsblog/home/?cid=nrcseprd1178206.

BIOGRAPHY

Laura Rathmell was born in Houston, Texas on April 26, 1995. Her curiosity in sustainable coffee stemmed from a visit to a sun-grown coffee farm while on a Plan II Maymester to Costa Rica. She will graduate in May 2018 with a Bachelor of Arts in Plan II Honors and a Bachelor of Business Administration in Finance from the University of Texas at Austin. In the future, Laura hopes to continue to spread the word about Bird Friendly coffee, and watch it continue to grow.